DIESEL EXHAUST FLUID DISTRIBUTION SYSTEM RESEARCH AND RECOMMENDATION PROJECT

A

PROJECT

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RECOMMENDATION PROJECT

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Diesel Exhaust Fluid Distribution System Research and Recommendation Project

UAA School of Engineering MSPM Program Capstone Project

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Abstract

ConocoPhillips Alaska needed a solution to distribute Diesel Exhaust Fluid to Tier 4 heavy equipment throughout its 400 square mile Kuparuk Business Unit. At first glance, there were not any immediate and viable solutions that fit the business need and aligned with the company's strategic goals. Additionally, the Diesel Exhaust Fluid industry is emerging following an Environmental Protection Agency mandate that engine manufacturers reduce their Carbon Monoxide emissions to near zero levels after November 2012.

The researcher conducted a variety of searches and defined the true issues regarding Diesel Exhaust Fluid and distribution of the product by finding, customizing and creating a distribution system that would be a viable solution. Through research and analysis of the products, legalities, environmental impacts, logistics, and operations and maintenance procedures, the researcher provided an initial proposal to the client that satisfied the sponsor's need to show senior management that a solution was in the works.

The problem that ConocoPhillips was challenged with had not been taken on before by any other organization on the North Slope. There were no subject matter experts or business as usual examples to follow. The project team had to write the manual for how to take on such a new problem threatening the reliability of the Heavy Equipment fleet to its Kuparuk operation. The researcher provided a solution, satisfied the client and created a custom system currently in production in Anchorage, Alaska that is a completely new concept.

Literature Review

On November 12th 1996, the Environmental Protection Agency enacted a law regulating diesel engine manufacturers to reduce their carbon monoxide emissions. This law was enacted to reduce the carbon monoxide emissions given off by diesel engines in order for heavy equipment to make less of an impact on the environment. The law required manufacturers to reach a certain percentage of reduction in tiers broken down into time segments. "On May 23, 2012, the Administrator signed a Notice of Proposed Rulemaking (NPRM) with revisions related to emissions controls on diesel-powered emergency vehicles and revisions related to scheduled maintenance intervals for diesel engines and vehicles using Selective Catalytic Reduction (SCR). The NPRM also included revisions to offer short-term relief from performance inducements related to the emission control system, for general purpose nonroad engines while operating in temporary emergency service." (EPA, 2014)
(See Exibit A)

ConocoPhillips Alaska is an oil producing and exploration company that operates the Kuparuk Oil Field on the North Slope of Alaska. Located approximately 40 miles west of Prudhoe Bay, the field is North America's second largest Oil field by area. A little over 400 square miles it sits nestled on pristine Arctic tundra and reaches the shores of the Beaufort Sea that leads into the Arctic Ocean. Kuparuk is remote. It has many logistical problems and given its location, is subject to extreme weather conditions. Winter-like conditions can and have lasted nearly year round. With nearly 10 months of winter every year, this extreme climate poses unique difficulties to traditional methods of operating an oil field.

Heavy equipment such as excavators, road graders, snow blowers, dozers, loaders, rock trucks, rock buggies etc. are essential for operations and maintenance on the North Slope. Heavy equipment such as lifting equipment (cranes and boom trucks) is also part of the heavy equipment fleet that is essential to the operations on the Kuparuk Field. Approximately every 10 years, ConocoPhillips upgrades its heavy equipment vehicles to newer models. Older equipment is stripped down, shipped to Fairbanks, Alaska, and auctioned off. Newer equipment replaces the older more aging fleet of about 1500 pieces of heavy equipment in incremental steps.

Heavy Equipment manufactured and purchased post May of 2012, has a Diesel Exhaust Fluid System integrated into the operations of the engines. This feature of the engine exhaust system injects Diesel Exhaust Fluid into the emissions system making a chemical reaction with nitrous oxide and burns up transforming into soot. This prevents most of the harmful atmospheric emissions from reaching the atmosphere and making an impact on the environment (Dieselforum.org 2014).

"Nonroad diesel engines are used in machines that perform a wide range of important jobs. These include excavators and other construction equipment, farm tractors and other agricultural equipment, heavy forklifts, airport ground service equipment, and utility equipment such as generators, pumps, and compressors." (epa.gov, 2014) ASRC Energy Services is Conoco's largest contractor company and supplies equipment and personnel to handle the bulk of their operations and maintenance programs.

In an effort to act in accordance with environmental control systems now being implemented on diesel equipment, ConocoPhillips proposed to adopt and procure a system in which they could distribute Diesel Exhaust Fluid. New equipment built after 2010 comes equipped with Selective Catalytic Reduction (SCR) technology based on urea diesel exhaust fluid and a catalytic converter to significantly reduce oxides of nitrogen (NOx). SCR is the leading technology being used to meet 2010 emission regulations. (Cummins, 2014)

At the time of this research and project, there were no manufacturers who design and build Diesel Exhaust Fluid Systems for the Arctic conditions and climate. ConocoPhillips asked the researcher to research, recommend and purchase such a system to be delivered by the end of summer 2015. This paper will describe the methods, research and analysis it took to make this project the success it was. It will cover the methods used to perform ahead of schedule and complete the project earlier than anticipated. There were significant risks, mitigations, difficulties and lessons learned in completing a project that at the time had not been undertaken by any other company in the Arctic of the United States. The research for this project was different because the client, ConocoPhillips asked for a system that could be both mobile and stationary as they fit the business need.

Project

To effectively answer the question of the sponsor to the project, research was going to have to be conducted with the resources available. The researcher was assigned a project team composed of 8 people from different functional departments all with some vested interest in managing and controlling this new system. There was no doubt the system was going to incorporate a department. The incorporation of this system would consist of the department operating, storing, ordering, stocking, managing, distributing and controlling the final product.

The difficulties with this aspect of the project meant the project was going to balloon in scope depending on the assignment of the responsible department. ConocoPhillips and AES have developed a zero incident safety culture as part of being a company that is a member of the VPP audit initiative that reduces visits and inspections by the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA). The main component of this culture is to protect the worker by use of "engineering safety issues out" using "mechanical advantage" a "barrier removal system" and making the task as simple and "easy as possible." The client wanted the department group titled 'Field Support' to be the responsible department for managing and controlling the system. The reason being, the Field Support group is already tasked with fueling the entire field. This additional fluid for dispensing would not be too difficult and minimal changes to job scope were ideal.

The project specifically consisted of one scope. The scope of the project was to research, find, recommend and assist in procuring a Diesel Exhaust Distribution System fit for operation in the extreme Arctic climate while adhering to the safety culture requirements and fit within the business strategic goals of operations. Before the project was assigned to the researcher, the project sponsor realized that the current knowledge, resources and expertise on the field could not provide an answer or a solution. This is why the project was assigned to the student

researcher. The project was new and there was no history of prior solutions in operation on the field.

Literature Review: Researching Diesel Exhaust Fluid

Initially, the assumption was that Field Support would take the assignment in stride. They would work on an action plan to incorporate this new position and job task into their normal daily activities. The assumption before the project really kicked off into the research phase, was that this was the most likely outcome. The researcher began research under these assumptions. The researcher used the internet to search for articles, subject matter experts, and contacted vendors, reached out to other North Slope contractor companies to confirm this aspect of the assumption. The researcher began conducting weekly meetings on the topic, creating agendas that posed various questions in advance to the project team. The meetings included the sponsor and the first phase of research began by composing a requirements traceability matrix based on the research conducted by the project team and answering the questions on the questionnaire (See Exhibits K, L in appendices)

The questionnaire changed every meeting as each week the project team made strides in developing an ideal product that met the following criteria:

- Environmentally prudent and responsible
- Legally acceptable
- Appropriate safety devices and features
- Followed the DEF manufacturers guidelines for storing, handling and dispensing
- Does not deviate from other similar operations (minimal training required)
- Equipped to handle the extreme cold temperatures
- Consisted of parts ConocoPhillips currently keep in stock
- Be composed of units that our mechanics currently work on and are familiar with

Based on this criterion early on in the project, the project team moved towards a possible solution that involved a trailer. Research on line indicated vendor products were found in trailers that could potentially meet the stakeholder's needs. Each stakeholder was measured and weighted on importance to these requirements. Stakeholders consisted of various department managers who would have something to do with the project's end product. However, their input weight to the project direction was inconsistent with achieving the projects end goals. For example, the group titled 'Roads & Pads' consisted of operators responsible for operating the heavy equipment. However, because the operators had little to do with handling the system but were really classified as the end users, their input was weighted significantly less than the 'Field Support' who would actually be handling the operations behind distributing the DEF fluid. This was documented in a power interest grid to document influence and input control for decision making in the project (See Exhibit B in appendices).

After compiling the requirements and weighting the requirements based on influence and importance to the project's end goal, which was decided between the sponsor and the researcher,

who continued the research and found out several different aspects to DEF itself and the logistical problems the project team would face which was the bases for forming the risk register.

While it seemed like a practical solution to incorporate the DEF Distribution System through the procurement and use of a trailer, there were many other issues that arose from seeking the solution. Research indicated that DEF may not be a permanent solution as an industry practice for eliminating carbon monoxide emissions. The researcher printed out a report by the Department of Energy totaling over 1300 pages of research conducted on DEF and the various engine manufacturers. The report also indicated grant monies allocated to various companies, universities and engine manufacturers to find ways of developing an alternative method for eliminating DEF as a product and the main component in Tier 4 engine emission reductions. (See exhibit C)

The report showed allocations of substantial grant monies to the University of Florida and the University of Minnesota to develop an alternative method for reducing carbon monoxide emissions. Diesel Exhaust Fluid (DEF) is the reactant necessary for the functionality of the Selective Catalytic Reduction (SCR) system. It is composed of 32.5% high purity urea and 67.5% deionized water. Urea is a compound of nitrogen that turns to ammonia when heated. "DEF purchased should display the certification of the American Petroleum Institute (API), German Institute of Standardization DIN70700. The International Organization for Standardization ISO22241-1 and meet AUS – 32 specifications." (Cummins, 3) DEF weighs approximately 9 lbs. per gallon. Currently there are no additives that can be added to DEF to keep it from freezing and maintain its integrity to assist in reducing emissions. The alternative researched method had to deal with a particulate filtration system that essential is designed to reintroduce exhaust into the diesel mixture until it cannot be burned any further. This also turns the emissions into soot. Maxx Force, an engine manufacturer produced such an engine and sold them to Caterpillar for their C-10 tractors. Caterpillar ended up suing Maxx Force for 700 million dollars because the engine failed to produce the horsepower promised (dieselforum.org, 1) (See Exhibit D in appendices).

The data in the aforementioned paragraph was a vital piece of information in changing the tone of the project. It did not necessarily interfere with the scope of the project, however it added a whole new look to the project. Requirements were then added by the sponsor who became concerned at this researched information. Instead of a robust and permanent solution for DEF- the fact that there are companies and universities seeking to make an alternative method for tier 4 engines added some unique challenges to the project. The first requirement added was to make whatever the end product was going to be able to be repurposed if DEF were to become obsolete anywhere in the future. This added a lot of issues in my research and communicating with the project team. Vendors and manufacturers were building their dispensing systems without the stipulation that they build a seemingly temporary solution. Since the sponsor was concerned that the project team would order a product that may become obsolete in the near future, discussions, questionnaires and research shifted. This did cause some additional communication needs. Additional meetings and conference calls with vendors needed to be scheduled in order to change their bids and proposals.

The second requirement to come from this discovery through the research was the scale of the size of the dispensing units the researcher was researching. The researcher no longer needed to look at large extremely expensive systems given that at some point our proposed solution was now going to be significantly reduced; given that creating a permanent fixture on the Kuparuk field was not going to happen. This streamlined my research slightly by eliminating large systems, but it made the research more difficult by adding such a stipulation as the system the sponsor purchased may not be needed in a few years. The researcher switched efforts in research at this point. On the power interest grid, the client/sponsor had top priority. The sponsor in this case is extremely involved and interested in knowing everything about every product considered for purchases as there are many consequences for the project if a thorough investigation into the equipment coming onto the field is lacking or missing.

Additionally, the weight of DEF at 9 lbs. per gallon was vital in the research for streamlining the search. If the project team were to look at any mobile equipment as previously instructed, this posed an interesting problem. With DEF outweighing water, diesel and gasoline this posed many logistical problems not previously discovered during our initial meetings. Several avenues for delivering DEF were being researched at once. The researcher was looking for methods to dispense DEF throughout the field which included smaller units that could be "forked" onto one ton diesel flatbed trucks, stationary housing units for storing the dispensing system with a holding tank, trailers that could be pulled by a one ton pick-up truck, converted diesel fuel trucks outfitted with 5,000 gallons of diesel and 500 gallons of DEF, and the most sought after unit which was a unit that was both stationary or mobile containing the ability to hook up to shore power or run off of its own generator for up to 48 hours.

The research into the weight of DEF was very interesting and took the project in yet another turn as far as requirements are concerned. The scope remained the same, however weight became an issue. The nature of DEF being 9 lbs. per gallon combined with another more serious issue. DEF is corrosive to aluminum. This was a huge problem and required adjustments to the requirements traceability matrix, implementation of the communication plan and procedure and an update to the vendor selection matrix. Since DEF could not be stored in aluminum tanks this posed many additional requirements to be added and gave me some logistical issues to research further (govictoryblue.com, 2014) (See Exhibit K in appendices).

ConocoPhillips Alaska primarily contracts with Lynden Transport and Carlisle Trucking Company to bring materials to the North Slope. At the time of the research, neither company had a tanker truck outfitted with a stainless steel tank that could bring DEF to the North Slope in bulk shipments. Furthermore, a tanker truck out fitted with a stainless steel tank transporting a liquid at 9 lbs. per gallon was not feasible as the vehicle would greatly supersede legal limits for Alaska Department of Transportation weight restrictions coming up the haul road. Additionally, DEF would be too bulky and heavy to fly as air cargo to the North Slope as well. Further research conducted on the Environmental Protection Agency website and several phone interviews with Alaska's local EPA branch indicated that DEF had not yet been regulated by the EPA concerning bulk storage. DEF by itself is pretty harmless. However, all EPA regulations on DEF storage were regulated up 1,350 gallon storage tanks. Beyond that, the concentration of ammonia being held in one location changed the regulations on DEF. At the time of the research, the EPA had not yet regulated on whether or not DEF was to be regulated under oil and

gas jurisdiction or agricultural jurisdiction (EPA Federal Register, 2014) (See Exhibit M in appendices).

DEF should be stored in a cool, dry, well-ventilated area, out of direct sunlight optimally at 77 deg F. Higher temperatures have shown little impact on affecting the quality of DEF. However, the shelf life of DEF is a function of ambient storage temperature. DEF will degrade over time depending on temperature and exposure to sunlight. Expectations for shelf life as defined by ISO Spec 22241-3 are the minimum expectations for shelf life when stored at constant temperatures. If stored between 10 and 90 deg F, shelf life will easily be one year. If the maximum temperature does not exceed approximately 75 deg F for an extended period of time, the shelf life will be two years. A 32.5% solution of DEF will begin to crystallize and freeze at 12 deg F (-11 deg C). At 32.5%, both the urea and water will freeze at the same rate, ensuring that as it thaws, the fluid does not become diluted, or over concentrated. The freezing and unthawing of DEF will not cause degradation of the product (Cummins, 2014) (See Exhibit E and O in appendices).

Researching storage of DEF fell to the project team. Under the product specifications and involvement of several project team members, field verification on a proper place to store DEF at Kuparuk took place. The researcher went out with several department managers to review various locations and types of containers DEF could be stored in. Many options were presented as viable opportunities for storing DEF. The project team also spoke with facility engineers and the environmental departments. However, logistical issues to the end user arose which again changed the requirements of the project. There was one risk in particular that the researcher had failed to identify in the beginning (See Exhibit O in appendices).

To serve the current needs of DEF in the field, ConocoPhillips had been purchasing the product in 330 gallon poly carbonate totes. These totes are equipped with a micromatic quick coupler for ease of dispensing and drawing the product out of the tote and storing it in a 300 gallon tank inside the Heavy Duty Shop. This holding tank in the Heavy Duty Shop was not equipped for ease of use to the end user. The end user was required to grab a 2.5 gallon jug, fill the jug and dispense it into the vehicle in question. The Heavy Duty Shop is not set up like a fueling station for the operators. This put a lot of operators at risk having to pull up and descend their equipment, expose themselves to the extreme temperatures and fill the DEF tank in 2.5 gallon increments. This method was not the safest nor most efficient way of dispensing the DEF, hence the need for this project. Since the piece of equipment typically was driven away from the job sites to refill their DEF, the operators receive their fuel on the job site. The unanticipated risk the researcher failed to see at the project start was identifying this method as a system. This system is crude and not conducive to Conoco's organizational vision, however, it is a recognizable and defined system. The researcher did not anticipate there would be any changes to this system that would make an impact on the requirements.

There was an incident that luckily, because of the properties of DEF, was not a more serious issue. A front end loader was moving totes of DEF around inside a large warehouse heated tent in order to handle material behind the totes. The totes are made of a poly carbonate plastic. The totes are situated on pallets for ease of handling. The loader operator punctured the bottom of

the poly carbonate tote resulting in a 330 gallon spill inside the Wells Group construction tent. Because of the properties of DEF not being toxic or harmful to the environment, Conoco did not have to report or record this spill which would result in a fine from the OSHA and the EPA for the spill and failure to handle a hazardous material. All DEF packages will have a date code located somewhere on the product. The date code will allow you determine the date the DEF was made. 1 gallon containers will have a laser code imprinted on the bottle. 2.5 and 5 gallon containers have a small date code label applied to the bottle. Drum and totes will have a label applied to either the top or side of the product. DEF is a nontoxic, nonpolluting, non-hazardous and nonflammable solution. It is stable, colorless, and meets accepted international standards for purity and composition. DEF is safe to handle and store and poses no serious risk to humans, animals, equipment or the environment when handled properly. MSDS sheets are currently available on cumminsfiltration.com (Cummins, 2014) (See Exhibit O in appendices).

The researcher needed to adjust the communication plan in order to compensate. This event happened while the researcher was off slope and when the researcher returned to work the researcher did not receive any information that there would be a requirement addition to the matrix for several days. This resulted in the project slowing its momentum and my need to implement risk mitigation from the risk matrix. The researcher had identified the need to make adjustments to my communication plan but could not implement it unless the researcher was aware of the situation.

The new requirement as a result of this incident was that ConocoPhillips did not want to buy poly carbonate totes any longer. This led to additional research needing to be conducted on alternatives to the current method of purchasing DEF. It also added to the project the need for an additional storage unit to be incorporated into the final product as part of the system. Additional meetings were held and questionnaires were handed out to compensate for this issue in the project. At this point in the project it took over a week to get the project back on track. The researcher had anticipated in the project schedule something of this nature happening, however, the researcher wasn't aware it was happening for nearly a week. That was a failure on the researcher's part to assume nothing would change to the existing system.

The result of the incident added the requirement that ConocoPhillips now wanted the totes to be in stainless steel containers to avoid corrosion and to be more resistant to punctures from miss-handling. The researcher conducted research on this topic which was not anticipated in the beginning of the project. Stainless steel totes do exist and are readily available outside of Alaska. There was only one vendor within the state of Alaska that could be found that could get stainless steel totes. The researcher assigned the project team members to assist in scouring various vendors for stainless steel totes. At this point in the project at a status update, the researcher downgraded the project from green to yellow. The researcher had legitimate fear that the project was in danger of falling too far back on the schedule from all these additional requirements and research requirements and needed to implement additional meetings and questionnaires to get the project back on track. The project team came through and their research resulted in finding a vendor who had sister companies in the continental United States that could send them stainless steel totes for purchase with micromatic quick connects.

These totes, however, added additional requirements to the system. The stainless steel totes are not manufactured at 330 gallons like the requirements and research had produced from the poly carbonate totes. They were configured in 275 gallon totes however weighed more than the poly carbonate totes which added more research requirements. This also posed a cost issue to the sponsor. Freight being transported up the haul rate is done by weight. This was going to be an added cost to the sponsor. The sponsor asked for additional methods or options to avoid incurring this additional cost. The researcher called an additional meeting and assigned project team members to assist with this aspect of the project in researching less expensive alternatives. Since DEF is a new and emerging industry with the introduction of tier 4 equipment being manufactured post November 2012, the project team failed at finding any feasible alternatives to achieving what the sponsor wanted at such a remote location. Alternatives researched actually came back more expensive.

ConocoPhillips prides itself on being a responsible company to the environment, its people and the communities it serves. Conoco does not like to deviate from manufacturers guidelines. In light of this particular research, more requirements were added to the requirements traceability matrix, the communication plan was adjusted, additional meetings were scheduled. Questionnaires, meeting agendas and a project review were scheduled and implemented. The risk chart and mitigation tools were amended and mitigations were added especially when examining different vendors and the products available to meet the sponsor's needs. Further research conducted, went deeper into the mechanics of DEF which eliminated several vendors the project team had been working with. The researcher created a vendor measurement tool which was in matrix format that depicted which vendor's would be willing or able to meet the project team's specific needs. This tool was updated weekly and helped the project team whittle away at the vendors they had already started communications with. Unfortunately, it ended up eliminating the vast majority of vendors previously chosen and the researcher had to research and contact several new vendors. This risk was perceived in the risk register and occurred four times throughout the project. Lessons learned in this case was to double or triple the amount of vendors up front in an effort to front end load the project with as many viable options as possible (See Exhibit M in appendices).

Researching System Components

The dispensing system took some research outside of the DEF product. The standard nozzle diameter for dispensing DEF has been designed at 19mm versus the standard diesel fuel nozzle diameter which is 22mm. In addition, the tank cap for the DEF tank will be blue to further differentiation from the diesel tank. The SCR system will recognize solutions other than DEF, and the DEF indicator light will appear notifying the driver. Depending on the level of contamination in the tank, the vehicle may require servicing. (Cummins, 4) This aspect of the mechanics of the delivery system required a lot research. The master mechanic was assigned to the project team initially. He is the supervisor over all the mechanics in the Heavy Duty Shop. The researcher conducted research by making a questionnaire to interview and discuss with the mechanics the different aspects to maintenance on a delivery system. The reason the researcher pursued the Heavy Duty Shop mechanics for information is that they were already performing

maintenance on the fuel trucks who had similar systems imbedded in the truck systems. the research included an actual hands on approach by receiving detailed tours of the new heavy equipment requiring DEF (Braun, 2014) (See Exhibit N in appendices).

The mechanics took the researcher through the system. The researcher crawled under heavy equipment, inspected the tanks, gauges, sensors and followed the hoses that lead to the fuel intake manifold. This hands on research approach, led to researching additional requirements. Since DEF is so sensitive to the cold and freezes so quickly, the researcher needed to question vendors about their systems and products available that might be able to handle such cold weather such as outfitting the systems with heating units, Arctic grade hoses, auxiliary power units, insulation, protection from handling equipment, flow back mechanisms on the nozzles, and correct angling of the intake hoses into the DEF tank on the equipment. This last point was already an issue. Several light duty pick-ups had already seen service due to overflow of the DEF tank. DEF would climb up the intake hose (the hose that runs from the nozzle port to the tank) and freeze within minutes cracking the tank housing and the top of the tank itself resulting in the tank needing to be replaced before the vehicle could return to service. This has become an issue more and more common. Employees had been made aware of this issue and were instructed to under-fill the tank. These points were captured in the mechanic questionnaire. It was clear that additional requirements were going to have to be added to the system. The researcher began contacting and questioning vendors who specifically dealt with the components of DEF systems to understand component specifications and to determine if these previous issues could be remedied without the work being done by our shops. The researcher contacted several vendors and spoke directly with their engineering teams to present a viable solution to the sponsor.

DEF consumption will be approximately 2% of the diesel fuel consumed. Another way to consider it is that DEF will be consumed on a 50 to 1 ratio with diesel. (For every 50 gallons of diesel fuel burned, you will use 1 gallon of DEF). If you know the average fuel consumption of a vehicle, you can easily calculate the amount of DEF that will be used. The DEF dose rate will vary slightly amongst engine manufacturers. While most engines will have a dose rate of 2% of diesel fuel consumed, the dose rate will range from 1% to 3% (Cummins, 2014). Given this information as a result of research, the project team was able to compile additional requirements to add to the requirements matrix. Again, the requirements matrix grew and showed that the researcher had to again incorporate the communication plan and contact the vendors with additional requirements as well as schedule additional meetings with the project team and sponsor so the sponsor was aware of the changes in what the project team was going to have to pursue in the research. Analysis of this data combined with the analysis of the DEF fluid data was starting to show the vendor field narrowing on which products were available on the market to purchase. Analysis was showing that the solution ConocoPhillips was requesting would have to be a custom build. There were no vendors in Alaska who had readily available products to meet all the requirements off of the requirements traceability matrix. Furthermore most of the component and DEF requirements were available in the continental United States however the project team's research and analysis indicated that this project was so new and innovative that there was not a company producing a product that could meet our requirements list.

Research of Products

Upon compiling the data the end product options were narrowing. The product lines available that the client was interested in were as follows:

- Fuel truck with 5,000 gallon diesel and 500 gallon DEF System – custom build approx. $400,000
- Facility Module with 1300 gallon tank, DEF Integrated Dispensing System on skid with fork pockets/backup generators – approx. $150,000 plus $20,000 shipping and installation
- Custom built trailer with APU unit, glycol system, insulation and distribution system, dual and triple axel approx.. $75,000 plus shipping
- Oiler truck equipped with one tote storage of 275 gallons and dispensing system – approx. $375,000
- Custom built 100 gallon utility box for flatbed pickup trucks-approx. $10,000

Heavy Duty Expected Usage
Annual miles for average truck = 120,000 miles
MPG for average truck = 6 mpg
120,000 miles / 6 mpg = 20,000 gallons diesel fuel per year
DEF usage @ 2% of fuel consumption = 400 gallons of DEF / year
400 gallons / 20 gallon tank (average size) = 20 DEF fill-ups / year
Light Duty Expected Usage
Annual miles for average truck = 50,000 miles
MPG for average truck = 8 mpg
50,000 miles / 8 mpg = 6,250 gallons diesel fuel per year
DEF usage @ 2% of fuel consumption = 125 gallons of DEF / year
125 gallons / 10 gallon tank (average size) = 13 DEF fill-ups / year
(Cummins, 2015).

Currently, the Kuparuk field utilizes the Oilers bay and the 300 gallon tank installed at that location to resupply heavy equipment. It is supplemented by the purchase and distribution to various crews in 2.5 gallon jugs. Over the next several years, the anticipated use of DEF will increase dramatically as newer pieces of equipment are being added to field operations.

Analysis of the equipment being replaced over the next 5 years, combined with monthly and annual current usage of DEF on the Kuparuk field researched and compiled with assistance from the Materials Group Division 627 concluded that the current usage on the field was 1000 gallons of DEF fluid per month. The five year outlook on Diesel Exhaust Fluid which looked at the amount of equipment being changed out combined with the capital projects scheduled to commence during the next 5 years showed that the most likely need in 5 years was going to be upwards of 5,000 gallons per day initially. However, a decision that happened during the project outside of this project adjusted that number down to 3,000 gallons per day. The reason for this adjustment was the numbers were recalculated based on ConocoPhillips senior management team deciding to replace Kuparuk's diesel light duty vehicles such as ¾ ton and 1 ton pickup, flatbed and box van trucks with gasoline models. Simply, ConocoPhillips senior management

outside of this project concluded that dealing with Diesel Exhaust fluid was simply too complicated and short term solutions could not be provided, so they opted to replace in a two year time period the entire light duty fleet with gasoline vehicles.

The sponsor at this point in the project was feeling pressure to provide senior management with a solution and the first semester of the capstone project was coming to a close. The sponsor requested a proposal on what data the project team had collected and had available at this time. It was not complete and every avenue had not been explored, however, the researcher delivered to the client exactly what he had requested which was a proposal for a trailer unit that would be a custom build and incorporate two other vendors into the solution. One of the other vendors sold the distribution system while the other provided the climate control and power generation solution.

Fuel Truck

Each product line considered for the project required its own method to pursue research. The researcher travelled to Kansas City, Missouri to speak with a tank manufacturer who outfits vehicles with tanks. The vendor gave me a tour of the facility and showed me comparable products that the project team was considering. They had a contract to supply a Canadian municipality with 20 fuel trucks each outfitted with a separate DEF tank of 200 gallons with a complete dispensing system. The specifications on the truck were nearly an exact match that the project team and sponsor had agreed they wanted to see.

However, the specific product they had to offer had several issues and did not meet all or nearly all of the requirements the researcher had spent months researching and compiling with the project team. There was going to have to be some serious re-engineering to the product line they were offering to meet our strict safety culture and standards. Additionally, the truck was not built to handle the conditions in the Arctic. It had exposed compartments that would let snow and ice build inside of and rendering the product useless to our needs. This research led the researcher to conclude that the researcher had to develop criteria to judge and weigh vendors by based on how many requirements they met, how difficult it would be to outfit their product with our needs and if their company was in a position to deliver our requirements. In this case with the vendor in Kansas City, their company preferred larger contracts such as the one mentioned in Canada with purchase orders numbering in large quantities. After several conference calls and meetings with them the researcher concluded that they were unwilling to invest the time and effort the researcher needed them to produce one or two trucks with our specific requirements. The project's order was simply too small for something they wanted to take on.

The researcher contacted dozens of vendors who outfit tanks on trucks with integrated DEF systems. The researcher loaded each vendor into the matrix depicting how many requirements they met already, if their company was willing and able to meet our requirements, the build times upon receiving a purchase order and their speediness in response to our requests. The researcher also compiled lists of vendors who would take the time to have their engineers included in the conference calls and meetings as opposed to sales team members. The project team frequently encountered sales team members from various companies who would ensure us that they could take our requirements to their engineers and present us with a solution they would be willing to

undertake. This was a lessons learned moment in the project. The lesson learned: give vendors a deadline for response or the consequence will be that the project will move forward without them. The researcher implemented this lesson learned and added it to the risk register. As a new project manager the researcher had no experience in dealing with vendors to the scale and degree in which this project had called for.

The sponsor's preference was to procure a fuel truck with the capability of dispensing both diesel and DEF, however customizing and engineering a fuel truck that could meet the requirements was too costly and timely for what the sponsor wanted. Research by questionnaire with vendors and engineering departments proved build times and engineering design made this option and solution expensive and timely. Time was becoming a serious issue. The sponsor was concerned with providing a solution in a more timely fashion due to the fact that employees currently on the field were being exposed to an unnecessary hazard on a daily basis. The decision at this point was to move on to an alternative solution.

Facility Module

Research on the Facility module was extensive. ConocoPhillips Alaska decided to change the light vehicle fleet over to gasoline. To accommodate that, they are constructing a gas station located at a central facility. The gas station is to have an attendant who refills vehicles with gasoline as the vehicles pull up to the station. This does not impact the heavy duty fleet as the fleet runs on diesel, however, there was an opportunity to combine forces with a DEF filling station as well in conjunction with the construction of a gas station.

The regulations and environmental impact of having a gas station located on location was immense. Research included meetings with facility engineers, environmental specialists and state representatives to decide if this was a viable solution to the DEF project. Engineering took the requirements matrix the researcher had provided and added additional requirements. The research discovered the general proximity additional modules could be located in vicinity to the gasoline tanks and pumps. A key finding was that due to the nature of the lease ConocoPhillips has with the Barrow Borough, ConocoPhillips could not put the gasoline tanks below ground. The gasoline station was being constructed with AGT's or (Above Ground Tanks). This required additional research with the state of Alaska and requesting information on what type of tanks could be stored near gasoline Above Ground Tanks. Facility engineers at Kuparuk assisted with research and determined that since the tanks would be above ground, the facility module would need to be engineered with blast protection unless the project team found an alternative location to put the module. The researcher researched field and pad maps to determine possible solutions in finding locations that would be large enough for heavy equipment and tractor trailers to be able to easily position their vehicles to dispense DEF.

The researcher's findings indicated additional meetings would need to be conducted and another questionnaire for the project team to answer. This led to the project team assisting in finding if this was still a viable solution through compartmentalizing the research into different categories. Findings from this research indicated that most viable locations lacked the accessibility to shore power. This wasn't a problem per se, but running shore power to proposed sites would be an

additional cost. Further research indicated that the additional cost to supply shore power would be as much if not more than the unit itself. The sponsor did not like this fact found in the research. The questionnaires returned also indicated the project team was not ready to support or further this option as if it was a self-filling station. Various departments from Camp Maintenance, Field Services, Electrical and Insulation would all be responsible for maintaining the unit and keeping it clear of obstructions, i.e. snow build up. After meetings with these departments, it was clear none of them wanted the extra work load and did not want to take on more responsibility or sparing the additional man power to operate and maintain the unit.

The vendors on this product were impressive. They supplied information and were extremely knowledgeable. On the vendor assessment matrix they were by far the best to work with. Engineers were readily available, informative and provided solutions to our concerns and requirements. However, after receiving word from our own engineering department that additional measures and requirements would be imposed on this build due to the fact it would fall under facility control, this option quickly went by the wayside. After ConocoPhillips engineers placed their requirements on top of the project team, which the vendor was willing to take on, it drove the price over $500,000 which the sponsor was not willing to pay. Additionally, the sponsor would cede control of the system to the facility manager which was not to the sponsor's liking.

One key requirement that failed in this particular solution was the heavily weighted ability to repurpose the product should DEF become obsolete in the foreseeable future. This was a top priority that stemmed from earlier research for the project sponsor. The module could have been repurposed but its use for anything practical would have been subject to scrutiny. There are a lot of departments that could utilize a heated building, however the functionality and the practicality of having such a building was not in line with the sponsor's strategic goals.

Custom Build Trailer

The trailer option and proposal required the most time in the project. It required the most research, meetings and questionnaires. The trailer option at first glance met the requirements the project team and sponsor had come up with. Upon conducting research, the trailer could be a viable option and one was nearly purchased. However, for every requirement it met, it had either a new requirement added on to it or it posed an additional hazard or issue. Weight was a major concern with the trailer. Several vendors successfully sent proposals based on the project team's requirements for the product, however, most of the vendors failed at meeting the requirements in the vendor matrix. They were sluggish in response and wanted several orders to secure a transaction, or their build times were too lengthy for the project team to consider (See Exhibit G in appendices).

Research on the trailer included the components of the trailer. Research concluded that heavy duty axels were required to be fitted on the trailer. With all the systems needed to be implemented on the trailer, there was a distinct possibility that this was going to end up being a triple axel trailer. It would take a tractor to tow it around eliminating the work group who was

going to be responsible for carrying out the job task; and triple axel trailers are very difficult to back and maneuver around congested and limited spaced areas. After discovering that between the weights of the tank combined with adding the dispensing unit and the Auxiliary Power Unit on to the trailer, the trailer was going to be in excess of 20,000 pounds when fully loaded with DEF. Customizing the trailer was within the sponsor's budget and the product specifications all fell into fulfilling the requirements on the traceability matrix, however; with the additional weight and harsh weather conditions on the North Slope it became more difficult to sell this particular option to the client.

One aspect of this researched product was that being a trailer it would stay under control of the sponsor and be included in his fleet as opposed to falling under facility management. Further research and questionnaires with ConocoPhillips Alaska's own environmental department indicated that the tank be equipped with double walls or a secondary containment unit to prevent spills on the roadway or pads. The vendor's agreed to meet this requirement, however; it added additional weight to the trailer. This brought with it additional issues.

The researcher conducted additional research regarding the towing capacity of ConocoPhillips fleet vehicles combined with the trailer hitch weight capacities on our fleet vehicles and discovered additional requirements would have to be added to the matrix. The trailer was now too heavy for the standard and existing fleet vehicles to tow. Additionally, the 'Spine' road runs through the field and because the Trans-Alaska Pipeline System or (TAPS) runs alongside the spine road, it falls under the state of Alaska Department of Transportation or (ADOT). Under these requirements listed by the ADOT system, the type of trailer the project team was researching to purchase would be classified under a different weight scale and the chassis in which the trailer would be built on would not be adequate under ADOT regulations. This meant that the project team would be looking at a tractor to pull the trailer.

The issue with having a tractor pull the trailer was that the group and crew tasked with handling the operation of the DEF system did not meet the requirements for driving the tractor. To drive a commercial tractor trailer, the individual must carry a Class A Commercial Driver's License. The crew designated to handle the operations of the DEF system is known as the expediters or '88.' They are primarily unskilled workers who drive one ton light duty vehicles with custom trailer hitches and deliver mobile compressors, light plants, Arctic mobile heating units and generators. Their position does not require a Class A Commercial Driver's License. An option available was to require that the workers receive their Class A Commercial Driver's License but that would require the company pay more for their services. This would drive up the operating costs of the DEF system which was another feature the sponsor was not enthusiastic about.

The trailer was adding up quickly in cost by itself. It was approaching $75-85,000 in price and would require the purchase of a dedicated tractor priced out at $125,000 in order to pull and deliver the trailer at various locations on the field. It would have the power and ability to do what was required but the initial appeal of researching an inexpensive solution was quickly waning because after shipping both of those units to the North Slope the end cost was approaching $200,000 dollars for a dispensing system. The sponsor was still attracted to the proposal. Research showed it would be a successful option and it would fall under his management and control instead of having to relinquish control to another department.

The only other issue regarding the trailer was the requirement of repurposing the trailer in the foreseeable future-should DEF disappear from the marketplace. The trailer would have an APU (Auxiliary Power Unit), a double walled insulated tank and a dispensing system. It could be repurposed very easily as a fuel trailer; however the sponsor already had a fleet of diesel fuel trucks that are much more practical at performing the job task of refueling. A tractor-trailer combination to perform a job task such as refueling poses a lot of risk to the operator. The researcher conducted additional research to find the most common incidents on the North Slope regarding the heading '*Damage to Equipment'* and found that the biggest issue the workers had in regards to incidents was backing with a trailer. There have been 44 backing incidences in the last 8 years with ASRC Energy Services in this area alone where damage to equipment had occurred. This usually results in down time of the equipment while investigation and repair take place. The DEF system will be a critical component to the operation of the field. As new Tier 4 equipment takes over the aging fleet, the field will depend on the upgraded fleet to carry out its day to day operations and DEF will be an essential component in the equipment's operation.

The Oiler Truck

The oiler truck required a lot of research. There are over 132 vendors that comprise the parts for one oiler truck. An upgraded oiler truck is already forecast for the winter of 2016. The oiler truck is a large box van equipped with grease and fluids to service heavy duty equipment out in operation on the field. Its purpose is to perform preventative maintenance to vehicles in the field to avoid having these vehicles travel to one location for service. This allows the heavy equipment to stay where it is needed and provides a cost savings to not have to transport and move heavy equipment. It is literally a mobile lube shop. Its function is to grease axels, various joints and additional mechanical functions on heavy equipment, replenish oil and other fluids on heavy equipment working in the field.

After conducting research with the project team they found that an oiler truck could be custom built to accommodate 500 gallons of DEF. It is already equipped with dispensing nozzles, hoses, reels and is temperature controlled to accommodate, grease, oil and additional fluids. One issue that arose from the research on the outfitting an oiler truck indicated that the chassis of our current oiler trucks would not be sufficient in carrying the weight load of the added DEF system. If a new oiler truck was to be purchased and a DEF dispensing system was to be added, a larger chassis would have to be used. Currently the trucks are outfitted with a Kenworth 700 series tractors but upgrades to 800 or 900 series Kenworth Tractors would have to be purchased in order to support the added weight. The sponsor did not have a problem with this fact found in the research.

The oiler truck also fit the requirements of the project team and sponsor. Repurposing wasn't necessary as the oiler truck already performed a routine job task on the North Slope. The vendor that provided quotes and research materials has already worked with ConocoPhillips on a regular basis to provide ConocoPhillips with their equipment needs. The rapport with ConocoPhillips and the vendor has been maintained and business is conducted on a regular basis.

The only issue regarding the oiler truck is that it is not scheduled to be purchased until fourth quarter 2016 as part of the fleet upgrade. This did not give the sponsor what he had asked for, however, it was the solution with the least amount of variables. Research indicated that the solution of the oiler truck fit the best for the project. Everything from the right skill level of the end user; to meeting all the requirements for safety and managing the totes would be best in an oiler truck. The oiler truck, being temperature controlled, meant that the team wouldn't have to reinvent the wheel to provide the solution. However, one issue remained. The issue was that even if the sponsor decided to move the build of the truck upwards from fourth quarter 2016 to an immediate purchase, the build and delivery time would still take upwards of nine months.

Custom Build 100 gallon Utility Box

As research continued, it was becoming more and more clear that the products available were becoming very difficult to fit into our requirements. The project needed a solution to be proposed by the first week of December 2014; which was successful, and a purchase to be made by the first week of May 2015. The project also needed a solution to be in operation by start of winter 2015. The researcher conducted additional research on various product components on DEF systems and came across a manufacturer of insulated heated blankets for DEF totes. The manufacturer, PowerBlanket, used an inverter system in vehicles and custom built heated blankets that would heat a DEF tote to its intended manufacturer guideline. The custom built blankets could heat to 180 degrees which would be enough to keep DEF at its optimal temperature during deep freezes on the North Slope during distribution routes. This heat is produced off a 12 volt power supply by a vehicle and would be warm enough to keep DEF within optimal temperature range in temperatures as low as 50 below zero.

The researcher added an additional meeting with the project sponsor and told the sponsor the project needed to disband the project team and be given a specific individual who could help me with researching further to provide the sponsor with more of a viable solution. The sponsor wanted something quick but didn't like the options. Either the solution was too expensive and couldn't be repurposed, or vendors were not interested in selling such a custom build in the few quantities the project team was asking for. The sponsor agreed to the request and the researcher focused on researching what it would take to provide a solution as fast as possible.

The researcher held several meetings with the individual requested and began the research by contacting vendors. Research took the new team to a vendor located in Anchorage that builds rather unusual and custom things for ConocoPhillips. The vendor does not manufacturer anything themselves, but they do put custom ideas together. Based on all the previous research mentioned prior, the new project team asked if they could build a box with a metal casing, fit a poly propylene 100 gallon tank in it, built on a skid with fork pockets and lined with a power blanket that could be hooked up to a light duty vehicle power inverter, equipped with a DEF dispensing system that had a pocket to slip the nozzle and hose into that would be heated. Research indicated that this option was the product the client needed based on all the requirements, risks, hazards, availability, communication problems, vendor reliability, repurposing need and logistical needs.

Research indicated that such a product did not exist in the market place. The researcher's analysis of all the questionnaires, vendor bids, proposals, listening to the sponsor that this was the product the project team needed. This product would be light enough to fit in the expediter flatbed pick-up trucks, have double containment to satisfy environmental requirements, stay under the management and control of the sponsor, keep operating costs low, require minimal maintenance, equipped with stock able parts, befitting to the operators skill set and keep the costs low.

The vendor met all the requirements in the matrix and had great rapport with the client and as part of the bid guaranteed six weeks delivery. The project team received conceptual drawings and the vendor contacted the other vendors needed to size and spec out the unit for us. Each unit cost less than $10,000 and would provide the client with an immediate solution and buy time for the sponsor to outfit and purchase another vehicle. This was the last of the research and proposals the researcher produced for the project.

Analysis

For research, the researcher utilized the University of Alaska Anchorage library for DEF related articles in the Arctic. After many searches the researcher could not find any articles about creating, procuring and implementing a DEF distribution system. There were many articles regarding the complexity and problems with DEF as well as other problems regarding the added costs and maintenance with heavy equipment vehicles but the researcher could not find any articles or related materials in regards to distributing DEF to heavy equipment fleets in the Arctic. Further research on-line and conversing with dozens upon dozens of vendors who specialize in DEF products their responses supported the researcher's theory that there currently are no options in the market place to satisfy the needs of the project. The problem with this project in obtaining a DEF distribution system for use in the Arctic on a large scale operation is new and has not been done before. The solution provided by this project also proved this to be true.

Other contractors on the North Slope who support heavy equipment for their contracted work did not have an actual system or process for delivering DEF either. Some of the third party contractor companies used the 2.5 gallon jugs, or simply stored totes in heated tents or modules and had their equipment pull up to be filled on location. Some companies questioned for research, would heat the DEF up past its manufactured levels causing a potential failure or break down of the fluid to not perform its function properly. This is not an option for the client as they operate their business with a responsibility to follow manufacturer guidelines.

Research did indicate that in colder climates such as Michigan, New York, and Minnesota that there were many solutions available, however, logistically being in the continental United States combined with having the convenience of suppliers and many more resources available to them, their solutions, while effective, were not practical or more importantly applicable to the operating conditions on the North Slope and the remoteness and size of the field. Their operations were considerably smaller in size and the footprint which they operate did not apply to our need and application here on the Kuparuk oil field.

Procurement Mastery

This project involved procurement. It was heavily weighted on seeking vendor products and services. There were several issues in the project that arose from seeking a viable product line and reputable vendor. To research various product lines and vendors who could assist with the project goals, objectives and deliverables with this project; organization and evaluation of the products and vendors was essential. It was particularly essential to the project since there were no known products that fit the requirements. After extensive research by the entire project team, no readymade solution to the project problem could be found.

In an effort to measure the procurement success in the project, the researcher created a matrix that listed the vendor, prior ConocoPhillips relationship with the vendor, percentage of requirements met, other clients the vendor conducts business with, diligence and timeliness in communicating back with the project team, willingness to meet the project team's safety and environmental needs and build-time after purchase order received. The researcher used this matrix to determine if and when the project needed to part ways with communicating with a vendor. In the first semester of the project, vendors were taking too much time to get back to the project team, therefore the researcher decided to give vendors deadlines in which to present a proposal or bid, or at least an update. If the vendor could not deliver the project team's requests for bids or proposals in a timely fashion, the researcher followed up by making contact with the vendor. The researcher asked where the vendor was at with the proposal or bid and if they understood the project's time constraints. If they failed to meet the project team's requirements, then the researcher ended the efforts to work with the vendor. This strategy proved useful and made vendors more competitive in delivering bids in a timelier manner which streamlined the process and helped the researcher supply information and continue research without risking time constraints on the project.

The matrix created, added to the body of knowledge in procurement by creating a matrix based on logistical locations and ability to deliver custom build products so far away. To measure the matrix, the project team decided what percentage a vendor would have to meet in order to continue the lines of communication with that vendor. Additionally, the questionnaires used in the research portion were analyzed to determine how much subject matter knowledge the vendor had. It also measured if the vendor was able to put subject matter experts such as engineers on the job to make sure the project team received the information they needed to satisfy the sponsor's requirements. The sponsor needed professional and expert assurance that if a product was to be custom built for the project, when it arrived and was implemented in the field, that it would work with minimal operational and maintenance issues and was simple for the end user.

The procurement aspect of this project produced a total of five separate proposals for the sponsor to review and base his decision. The five proposals included research on the components, safety mitigation features, engineering specifications, environmental protection features, ratings on vendor quality and a build time as well as the vendor bid. The research was collected from vendors, online sources and from manufacturer representatives from both Cummins and Caterpillar. (See Exibit G in appendices).

VENDOR REQUIREMENTS TRACEABILITY MATRIX												
Project Name:			DEF Distribution NSB Project									
Project Manager Name:			Mike McDonough									
Project Description:			Procuring a DEF dispensing system for the Greater Kuparuk Business Unit									
ID	Refrences Provided?	Prior Caterpillar Relationship?	Purchasing Need	Description	Status	projected procurement date	Priority	Understands Complexity? Knowledgeable ?	Percentage of Requirements met	Meets Deadlines	Vendor	Additional Comments
Phase Gate 1			The procurement specialist team is in charge of the following									
1.1	N	N	Custom Built Trailer	Customized Dispensing Trailer	Declined	May 15, 2015	H	L	66%	N	Thunder Creek	Specialized account or purchase order will be req
1.3	Y	N	Custom built tote power module	Customized Dispensing Module	Logistical issues	May 15, 2015	H	L	100%	Y	AmericanCarrots	Specialized account or purchase order will be req
1.4	Y	Y	Custom built Flatbed Tanks	200 Gallon Flatbed Dispensing System	In Progress	May 15, 2015	M	H	100%	Y	Truckwell	Specialized account or purchase order will be req
1.6	Y	Y	Heating units inside tank structure	Computer Work Station Training	In Progress	May 15, 2015	M	M	100%	Y	PowerBarrier	Specialized account or purchase order will be req
Phase Gate 2												
1.3	N	N	Fuel Truck equipped with DEF Dispensing	Fuel Truck	Build time too long	May 15, 2015	M	H	60%	N	Seneca Tank	Specialized account or purchase order will be req
1.5	Y	Y	Oiler Truck outfitted with DEF Dispensing	Oiler Truck	Build time too long	April 15, 2015	M	H	80%	Y	Owen's Truck Delivery	Specialized account or purchase order will be req
015												

This matrix was presented weekly and updated regularly to the project sponsor. The measurement of the success of the tool was discussed in the weekly meetings. Not only did this tool see regular use during the project but was also adapted into other projects in a custom program called Fleet Focus. The project sponsor determined the use and the success of this tool. The project sponsor was able to reference this document to tell the project team and project manager to whom to conduct further business relations with and to also dictate where more research needed to be conducted in the project.

Time Management Mastery

The project at times was at risk of failing to stay on schedule. The project plan and risk register had mitigation tools and techniques to manage time effectively. During the project life cycle the researcher had to make two adjustments to the plan. Analysis of the project plan showed wear the root causes of lost time to the project were occurring. The first issue identified was the fact that due to the nature of working on the North Slope, employees are on rotational shifts. Many employees follow a two week on slope and a two week off slope rotation. Some employees are

on a 3 week on slope, 3 week off slope schedule. The project team consisted of employees who followed either schedule. This became a problem as project team members who were assigned different tasks for research could not attend status meeting, project update meetings or relay their finding to myself or the project team.

The researcher implemented a dual meeting schedule for the research portion of this project which meant the researcher scheduled the same meetings one and a half weeks a part to make sure rotations were covered. To do this, ConocoPhillips uses Microsoft Outlook and the researcher used the 'schedule meeting' tool which pulled data on project team members' schedule. The researcher would invite project team members to meetings based on availability and their rotational work schedule. This was an overwhelming undertaking and was not as successful as the researcher would have liked, so the researcher standardized a meeting time that had a general opening in everyone's schedule weekly. The researcher would follow up by communicating with project team members over the phone and sent reminder alarms through the use of Microsoft Outlook. Additionally, the researcher created a project team in the address book of Microsoft outlook in an effort to relay meeting agenda notes, project status updates and new research and task assignments so that the project team would have the information if they could not attend or could review the progress of the project when they returned to the North Slope from their time off.

The second strategy the researcher implemented after analyzing the root causes of lost time in the project; was giving vendors a deadline to either respond or provide a quote based on our requirements. The researcher built a matrix to determine the strength of various vendors so the sponsor would know who he may or may not want to do business with. This strategy the researcher employed from lessons learned in a Procurement Management course taken at the University of Alaska Anchorage. Implementing this strategy actually saved the project from stalling and falling so far behind that the sponsor would either lose interest or give up and continue with business as usual methods (See Exhibit G in appendices).

Quality Management Mastery

With a continually growing list of requirements from the project team's research into product options and analyzing the business need, the researcher created a requirements traceability matrix and with the assistance of Bruno LeGrand in the Systems Engineering Fundamentals course at the University Alaska Anchorage. The researcher utilized CORE software; a software engineering program to streamline the requirements. This allowed the requirements to be viewed in various formats and compiled the data into an easily accessible and readable format. This tool allowed me to calculate and weigh vendor bids on products and catalogue the amount of requirements they were able to meet. Vendors who scored low on the amount of requirements

they could meet, coupled with the delivery time after receipt of a purchase order were eliminated from the project.

ConocoPhillips has instituted a Zero Incident Culture around making sure that the employees who come to work leave in the same, if not better condition than they arrive. When looking at a custom build system such as this project required, the researcher needed to request drawings, diagrams and photos to be sent so the project team could look over the units and add to the requirements, and ensure the removal of pinch points, lifting over 50 lbs. or other components that may cause issues with the worker being subjected to injury. The vendor needed to understand that safety requirements regarding the system and understand it was the top priority of the function of the unit. This required vendors to rework some of their designs to accommodate our safety culture and expectations for our contract employees (See Exhibit L in appendices).

The vendor matrix that was used for this project as seen in the above mentioned Procurement Management section, also assisted in determining the quality of the products the project team was responsible for requesting bids from. The vendor matrix in use, helped determine the quality of the vendors by method of the vendor requirements matrix. Additionally, asking the vendor who their other clients and customers were, was something the project sponsor requested the researcher find out. If they had reputable and well-known customers or clients, that was weighed in the matrix and helped assist the sponsor in making decisions for which vendor to choose to do business with (See Exhibit G in appendices).

Quality Management also played a role in determining how effective the research was to the project. The researcher's first questionnaires produced for the project were elementary in comparison to the questionnaires produced later in the project. When the researcher first started the project, the questionnaire quality and thoroughness seemed to produce more questions than answers. As the researcher became more practiced and experienced in working with the product and various product lines, the research conducted allowed the researcher to be nearly as knowledgeable as the manufacturer about the product specifications and various items on the systems being sold in the market place (See Exhibit I in appendices).

Quality management continued through the use of meeting minutes. The researcher kept a record of the meetings the comments concerns and the general attitude of the project team and the sponsor regarding the progress of the project. If the sponsor seemed to be upset in any way or dissatisfied with the results, the researcher dictated that in the meeting minutes in terms that were appropriate for distributing the meeting minutes in a professional manner to the rest of the project team (See Exhibit J in appendices).

Communication Management

To effectively move this project forward it was most heavily dependent on communication. With two sponsors continuously cycling in an out of the work place on rotating schedules as alternates, it was imperative that the researcher keep detailed notes, supply adequate meetings and discussion points and organize contact information. The researcher was able to organize the contact information and best method to contact through the tool: Microsoft Outlook and was also included on the stakeholder register. The register included methods for contact and frequency as well for each stakeholder and project team member. The researcher created a DEF project team group folder in Microsoft Outlook where information could be readily and easily emailed to the entire project team as well as make sure all the project team members' contact information was up to date so that members could communicate easily between one another.

On the vendor matrix that was created, the researcher included time zones of vendors which was very important as many of the vendors were located in East Coast or Central time zones (See Exhibit J in appendices). There were a few oversights by the researcher and project team members about scheduled teleconferences with certain vendors where the project team missed one another but rescheduling was not an issue at all in the project. The researcher created a communication matrix composed of vendors and project team members that was an extremely useful tool. The researcher was able to distribute this list to other departments and it also informed the project team to what task or responsibility people on the project team were responsible for. It was updated periodically and used to review progress at status updates. It was a powerful tool and helped stream-line the communication aspect of this project.

As the project progressed, the questionnaires helped to improve the communication aspect between the project team and the vendors. (See Exhibit I in appendices) It gave the vendors a very clear message that our request for bid was time sensitive and it ensured every project team member was satisfied with the result of the communication conducted in the teleconferences. The teleconferences were invaluable. The sponsor and project team members could all make the rounds to have their questions, concerns and requirements addressed directly with the vendor so there was limited information lost in translation going through one person and expecting them to relay all the information that needed to be exchanged. This proved effective if all the project team members were present. The researcher kept meeting minutes and made the minutes structured to address to whom was present the questions they asked and the answers they received so that these meeting minutes could be archived and made accessible to anyone on the project team (See Exhibit K in appendices).

There were some frustrating times regarding communication management which led me to make a rather bold and uncomfortable move. After the first proposal had been made, the requirements were not perceived to grow or to be changed much. The project team was becoming restless and their input eventually became counterproductive. The researcher held a one on one meeting with the sponsor and told him there had been enough information that the researcher and one other project team member should suffice to carry the project through to the end. He agreed with this plan and my strategy as the person the researcher had selected was very knowledge and

experienced with heavy equipment. The sponsor allowed the researcher to reallocate the project team to standby consultants and carry on with their normal job duties. If there was information or need for them later, the researcher could simply obtain the resources required from them. This effectively disbanded the large project team as there was no more use for it. It had served its purpose and the team members could return to their regular work loads. The researcher came to this conclusion after analyzing the data in the questionnaires and meeting minutes and determined the information was becoming stagnant and repetitive and no longer adding to the progress of the project. In fact, in some ways it was actually harming the project. As project manager and researcher, the top priority outside of pleasing the client is to protect the projects interests to ensure a successful delivery.

Conclusion

The project was successful. The research was successful. The lessons learned in this project was plentiful. The project is still ongoing but currently after two weeks of cycling paperwork through the planners and cost analyst, the project produced a final product currently being built in Anchorage, Alaska. A purchase order and a 25% down payment successfully went to the vendor March 11th. The final product consists of three vendors each providing one element to the final product. One vendor is supply the dispensing components (hoses, pumps connectors, nozzles, backflow preventers, meter gauges) One vendor is supplying the Powerblanket and inverter system and the last vendor is building the unit, supplying the tank and building the enclosure. Its scheduled delivery date for the first unit is May 12th 2015. It is a one of a kind, state of the art custom built flatbed truck tank, conceptualized by the researcher and Steve Greer, the one remaining project team member the researcher had requested. The team's design effort came as a result of the research conducted for this project.

The DEF distribution system was complex because there were so many variables and so many unknowns. The industry is new, regulations are new and information on what should be done to handle the operation could not be found. This project had to start from scratch and be built in many ways as it went along.

Following the holidays and the winter break from the University of Alaska Anchorage, Meetings kicked off in January to work towards actually purchasing what was provided in the proposal deliverables. However, there were still many issues with the proposal. It was complete and what the sponsor had asked for, but as project manager it was my duty to meet with the project sponsor and let him know he was not getting what he truly wanted. The researcher needed more time and to have further question and answer sessions with conference calls between he, myself and the vendors with already prepared questionnaires. The researcher came to this conclusion by weighting and measuring the requirements by the frequency in which they were discussed by the client. As the project team revealed and shared their data the researcher had asked them to prepare, the client kept coming back to the same solution, however it was a difficult solution.

The project produced 23 meeting minutes, five separate proposals, vendor matrices, communication matrices, requirements traceability matrix, 34 bids from various vendors, quality management matrices, a purchased product and a scheduled delivery time. The project will finish ahead of schedule by two weeks due to the strategies implemented in the project and the degree in which the research was performed. The project team was invaluable in providing the necessary research to expedite the project schedule.

Key Lessons learned:

- Building into the project schedule additional buffer times to compensate for the rotational schedule the project team was on.
- Requiring vendors have a deadline to provide bids or at least check in with the project team.
- Being more assertive in meetings about standing by the research and helping the sponsor make decisions about what he truly wanted.

This project was new to the North Slope. It is new to the academic world as applied to DEF systems in the Arctic for large fleets of heavy equipment.

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Key Terms

Key Term #	Key Term	Definition	Requirement Impact	Function
1	COP	**ConocoPhillips** - Oil and gas company	1 ~ 7	Business
2	COPA	**ConocoPhillipsAlaska**- Oil and Gas company North Slope	1~7	Business
3	ASRC	**Arctic Slope Regional Corporation** - Main Operations and Maintenance Company Contractor to handle O&M on the Kuparuk Field	8~16	Business
4	AES	**ASRC Energy Services** - ASRC Subsidiary to handle O&M operations on the North Slope of Alaska	8~16	Business
5	DEF	**Diesel Exhaust Fluid** - DEF is the reactant necessary for the functionality of the SCR system. It is a carefully blended aqueous urea solution of 32.5% high purity urea and 67.5% deionized water.	1~16	Product
6	SCR	**Selective Catalytic Reduction** - SCR is a technology that uses a urea based diesel exhaust fluid (DEF) and a catalytic converter to significantly reduce oxides of nitrogen (NOx) emissions. SCR is the leading technology being used to meet 2010 emission regulations	1~16	Function
7	API	**American Petroleum Institute** - API Certification is a voluntary program established by the American Petroleum Institute (API) which certifies and monitors that diesel exhaust fluid meets ISO specifications. The program was launched in March 2009. Cummins Filtration DEF currently meets ISO specification and is also API certified.	1~16	Business
8	IBC	**Intermediate Bulk Containers** - Intermediate Bulk Containers (IBC) are all containers larger than a 55 gallon (207L) drums, and smaller than a tanker	1~16	Function

Key Terms

9	Tote	**Stainless Steel Vessel for transporting and holding DEF** - The 275 gallon tote is disposable and primarily used for refilling of the larger plastic refillable tote. However, if customers do utilize the 275 gallon tote the transfer equipment must be DEF compatible and completely free of contaminants. Stainless steel and high density polyethylene plastic are DEF compatible materials.	2,3	Function
10	Micro Matic	**Valve System for Closed Tote Systems** - Micro Matic is recognized in the DEF marketplace as Closed System Solution providers for single use and multi-use container valve systems. Providing economical solutions for operations that require One Way, Returnable/Refillable and On-site Refilling, Micro Matic can assist in delivering consistent DEF purity, ensure packaging integrity and maximize operational efficiencies throughout the supply chain from fill to dispense.	2,3	Function
11	Closed Tote System	**Tote Dispensing System** - A third liquid-dispensing approach is the "closed" or sealed system, and this is a significantly safer approach than either the open or semi-closed methods. Closed systems rely on a pump to draw the media from the container and deliver it to the end process.	2,3, 13	Function
12	Mod.	**Module** - Structure designed to house a specific process or function.	1~7, 9,10~13	Function
13	Skid	**Skid** - Platform or base/foundation for the Module to sit on.	1~7, 9,10~14	Function
14	Picking Eyes	**Picking Eyes** - Fixture on the Module with an eyelet for feeding a shackle or other device through for the purposes of lifting the Module with a crane.	1~7, 9,10~15	Function
15	Fork Pockets	**Fork Pockets** - Built into the skid allows a forklift or loader to slide forks into the skid structure to lift the skid and module of the ground.	1~7, 9,10~16	Function
16	Tank Farm	**Tank Farm** - A collection of tanks above ground staged in one localized area	1~7, 9,10~17	Function

Key Terms

17	Cummins Engine	**Cummins Engine** - Leading manufacturer od Deisel Engines in the United States and several other world markets. Has done extensive research on DEF and the exhaust systems in their motors	1~7, 9,10~18	Research
18	LED Light Systems	**LED Light Systems** - Approved lighting systems for operating in classified areas. They are light systems that can be used around these areas because they are intrinsically safe.	1~7, 9,10~19	Function
19	Inverter	**Inverter-** Power inverter used in many applications. In this case it refers to a unit that can toggle between multiple sources and use the power supply on the vehicle to power the DEF unit.	1~7, 9,10~20	Function
20		**Dieselforum.org**- Forum where research and question come into place and manufacturers answer customer questions about products, specifications, technicalities and other various related questions.		Research

There are several new additions to the definitions chart which include research sources and definitions of terms found in the project and research paper.

ConocoPhillips

Alaska's Oil & Gas Company

ONE CREW · ONE JOURNEY

Proposal Management Plan

Diesel Exhaust Fluid Distribution System Research and Recommendation

00-01

14-3.5

12/1/14

Table of Contents

1.0 Proposal Project Summary

General Information

Customer	ConocoPhillips Alaska
Contract Name	Diesel Exhaust Fluid Distribution System
Solicitation Identification	00-01
Type of Contract	Recommendation
Terms of Contract	Fixed Fee
Estimated Contract Value	$38,000
Duration of Contract	5 Months
RFP Release Date	3/15/2015
Proposal Due Date	05/15/2015
Customer Procurement Office	Anchorage, AK

Project Focal Points

Program Manager	Michael McDonough
Sponsor Manager	Ray Chumley/Les Hardesty/Roger Hull
Teammates	Charles Stewart – General Foreman Field Support Terry Nunberg – Master Mechanic Heavy Shop Steve Greer – Foreman Oilers Bay Pat Holland – Superintendent Division 625 Field Services
Capture Plan	Yes
Capture Team Head	Michael McDonough

Project Scope and Deliverables

Scope of Work	Research and recommend vendors and products to custom build a Diesel Exhaust Fluid Distribution System for the Kuparuk Asset.
Primary Tasks	Research vendors and products that can meet the scope of work and the enhance the company's strategic goals.
Deliverables	Deliver a proposal based on research and vendor capability and willingness to meet ConocoPhillips strategic goals.
Proposal Organization	The overall proposal consists of the following volumes: 1. Proposal 00-01

2.0 Customer Profile

Intelligence on Customer Organization

Mailing address:	Pouch 340014 #626 Prudhoe Bay, AK 99734
Program Manager:	Ray Chumley/Les Hardesty
Contracting Officer:	Pat Holland
Source Selection Members:	Charles Stewart – Field Support General Foreman Terry Nunberg – Master Mechanic Steve Greer – Oiler's Bay Foreman Jamie Wajaich – Light Duty General Foreman Pat Holland – Field Services Superintendent

Source Selection Process

Research online different products and Vendors. Contact Vendors to research product attributes and functionality to determine best possible fit.

Customer Needs, Issues, and Hot Buttons

Mobile Distribution Platform
Safety procedures and compliance
Well lit area for worker
Accessible vehicle power supply
Easy egress and ingress for safety
Maintain a constant heat source while travelling

Customer Perceptions of Our Company

Conoco is large and has deep pockets

Vendor has custom built several products in the past for Conoco

Previous business experience has been positive

They generally enjoy conducting business with Conoco

There are a number of change orders and rework

Build times can be slow while communicating with various personnel

Moving the product can be slowed while dealing with requirements from Conoco

3.0 Competitive Analysis

Our Approach and Perceived Strengths/Weaknesses

Program Approach — Research as many products and options available on the market.

Key technical element: A product that can deal with cold, harsh climate.

Key management element: Communication between project teams and vendors

Key support element: Project team conducting additional research to meet department requirements.

Key past performance element: Vendors selected have performed to expectations

Key cost element: Stay within a reasonable budget. ($50,000)

Perceived Strengths

Strength #1: Vendor has provided products on schedule

Strength #2: Vendor has provided products within specifications

Strength #3: Vendor has provided products on time

Strength #4: Vendor has delivered a product within requirements and specifications.

Strength #5: Vendor has the company's strategic goals in mind.

Strength #6: Vendor communicated regularly and eliminates assumptions.

Perceived Weaknesses

Weakness #1: Keeping up with change orders.

Weakness #2: Communicating with other vendors for delivery of final product

Weakness #3: Change orders being miscommunicated

Competitor Profiles and Strengths/Weaknesses

Competitor A Profile and Strengths/Weaknesses— Truckwell of Alaska

Summary Profile Company that manufacturers DEF distribution products and has experience making equipment for cold areas in the lower 48.

Expected Approach They are to supply the dispensing system inside the trailer

Key technical element:	Tote Stands, dispensing system and instrumentation
Key management element:	Giving them specifications of the DEF Box
Key support element:	DEF nozzle and hoses for dispensing
Key past performance element:	Currently works with ConocoPhillips
Key cost element:	Low cost supplies are available

Perceived Strengths

Strength #1: Great performance record with other customers

Strength #2: Dedicated sales personnel and engineers

Strength #3: Regularly builds custom templates

Strength #4: Already producing products for extreme cold

Strength #5: Fast delivery time

Strength #6: Engineers on hand to work around specifications

Perceived Weaknesses

Weakness #1: Never worked with ConocoPhillips

Weakness #2: Dealing with change orders

Weakness #3: Communicating with other vendors

Weakness #4: Applying Conoco Safety standards to products

Competitor B Profile and Strengths/Weaknesses—TAIT Custom Trailer Sales

Summary Profile Will build specified trailer to project requirements. Has previously built several custom trailers for ConocoPhillips.

Expected Approach Based on past designs, will custom build trailer to project specifications

Key technical element:	Build trailer according to Conoco Safety Standards
Key management element:	Communicating specifications with other vendors
Key support element:	Communicate regularly with Project team on desired requirements
Key past performance element:	Hast past track record with ConocoPhillips to deliver trailers as specified.
Key cost element:	Stay within initial cost estimates.

Perceived Strengths

Strength #1: Has already manufactured several custom trailers for ConocoPhillips Alaska

Strength #2: Has a past performance record that aligns with Conoco strategic goals

Strength #3: Has delivered end products in a timely manner

Strength #4: Has been able to keep up with change orders

Perceived Weaknesses

Weakness #1: For Conoco projects has not collaborated with other vendors

Weakness #2: This is a new design and use from previous orders

Competitor C Profile and Strengths/Weaknesses—Power Blanket

Summary Profile Will supplement heating requirements with a custom built heated blanket specifically for DEF totes

Expected Approach After receiving dispensing specifications and trailer specifications will design and build a custom heated blanket specific to the project.

Key technical element:	Supplying heat directly to the totes located in the trailer
Key management element:	Relies on specifications from previous two vendors
Key support element:	Will build blanket to power supply located in the trailer and from vehicle power supply
Key past performance element:	Has demonstrated product capabilities at an event on location
Key cost element:	The blankets fall easily within cost parameters

Perceived Strengths

Strength #1: Has supplied many custom heated blankets for the specific application

Strength #2: Is eager to demonstrate the product to other possible customers

Strength #3: Has shown they can custom build any blanket to specifications

Perceived Weaknesses

Weakness #1: Has not conducted business directly with ConocoPhillips

Weakness #2: Has not worked with other listed vendors

Weakness #3: Communication between customer and other vendors has not been analyzed.

Bidder Comparison Matrix

Customer Hot Buttons and Issues	Weight	Us		Truckwell		TAIT Custom Trailer		PowerBlanket		NA	
Customer Hot Buttons ▪ ▪ ▪ ▪ ▪	5	Score	Total	Score 5	Total	Score	Total	Score	Total	Score	Total
Key Technical Issues ▪ ▪ ▪	5	10		4	9	5	10	4	9		
Key Management Issues ▪ ▪ ▪	5	10		5	9	5	10	4	9		
Key Cost Issues ▪ ▪ ▪	5	10		5	10	4	9	4	9		
Key Past Performance Issues ▪ ▪ ▪	5	10		5	10	5	10	4	9		
Key Support Issues ▪ ▪ ▪	5	10		5	10	5	10	4	9		
Other Key Issues ▪ ▪ ▪	5	10		5	10	5	10	4	9		
	Total	60		59		59		54			

4.0 Proposal Strategies and Themes

Overall Proposal Strategies and Themes

Primary Strategies

Strategy statement #1: Communicate with vendors and discuss requirements and issues with the project. Gather information on their proposed strategies to mitigate risks and constraints. Responses in a timely manner will matter greatly.

Strategy statement #2: Research vendors online for compatibility with corporate strategic goals

Strategy statement #3: Research vendors located in Alaska who can deliver products in a timely manner.

Major Themes

Theme statement #1: Partner with vendors and research their strategies offered.

Theme statement #2: Research other companies and seek their opinions of vendors.

Theme statement #3: Test vendor's response to projects specifications.

Technical Proposal Strategies and Themes

Primary Strategies

Strategy statement #1: Verify Vendor's knowledge and experience to meet safety and technical requirements

Strategy statement #2: Verify Vendor has strategies to mitigate issues in the Arctic and what those strategies are.

Strategy statement #3: Verify product specifications against like products already at Kuparuk.

Management Proposal Strategies and Themes

Primary Strategies

Strategy statement #1: Verify with all project team members that their requirements are being met by conference calls, specification drawings.

Strategy statement #2: Conduct conference call meetings with the vendors and department heads to verify and answer all technical questions.

Strategy statement #3: Verify with vendor and department heads that all safety requirements can be met via conference call.

Logistics Proposal Strategies and Themes

Primary Strategies

Strategy statement #1: Verify build time and shipping times to coordinate products delivery time via conference calls and meetings with vendor.

Strategy statement #2: Verify that purchased equipment has restock able and interchangeable parts with vendor and department heads.

Strategy statement #3: Verify with vendor and department heads possible repurposing uses for desired equipment.

Cost Proposal Strategies and Themes

Primary Strategies

Strategy statement #1: Acquire bids from vendors to make sure that specified products are within the allocated budget.

Strategy statement #2: Acquire multiple configurations on bids to explore all possible options from Vendor via conference call.

Past Performance Strategies and Themes

Primary Strategies

Strategy statement #1: Ask Vendors to provide customer references.

Strategy statement #2: Verify Vendor's past performance with ConocoPhillips where applicable.

Strategy statement #3: Contact other companies on the North Slope to see if they have done business with these specified vendors and if they would recommend working with them.

5.0 Staffing, Roles and Responsibilities

Proposal Management Team

Program Manager Ray Chumley / Les Hardesty

Proposal Manager Michael McDonough

Other Core Team Members:

1. Charles Stewart
2. Terry Nunberg
3. Jamie Wajaic
4. Pat Holland

Teammate Points of Contact:

1. Steve Greer / Project assistant
2. Jim Anderson / Project Assistant

Proposal Writers

Name	Volume	Phone Number	E-mail Address
1. Mike McDonough	00-01	907 659 3924	n1970@conocophillips.com

Proposal Review Teams

Pink Team

Leader Roger Hull/Committee Advisor/UAA
Member LuAnn Piccard/ Committee Advisor/UAA
Member Dr. Seong Kim/Committee Advisor/UAA
Member Ray Chumley/ Les Hardesty ConocoPhillips/ Sponsor

Personnel Expertise Matrix

The following team members have expertise in the required areas and disciplines described in the following legend and indicated in the columns below:

Legend of Disciplines:

A. Academic Advisor
B. Committee Member
C. Supervisor
D. Department Head

Name	Technical	Management	Support	Past Perf.	Cost	Other
Roger Hull			x			
LuAnn Piccard			x			
Dr. Seong Kim			x			
Ray Chumley		x			x	
Les Hardesty		x			x	
Charles Stewart	x			x		
Terry Nunberg	x			x		
Pat Holland		x		x		
Steve Greer	x			x		

Team Responsibilities

The Program Manager:

- Is responsible for the overall acquisition project effort
- Coordinates contacts with the customer
- Helps the Proposal Manager write the Executive Summary
- Leads the team in developing the solution and supporting Work Breakdown Structure (WBS) and WBS dictionary
- Facilitates strategy development and resource allocation in support of the proposal management plan
- Coordinates all subcontract relationships

The Proposal Manager:

- Organizes and directs the proposal effort from beginning to end
- Coordinates proposal issues with upper management
- Provides the knowledge and physical resources necessary for the proposal team to write the proposal
- Creates an information-rich writing environment
- Prepares the proposal's Executive Summary
- Analyzes the RFP
- Resolves RFP conflicts and RFP interpretations
- Leads preparation of the proposal management plan and ensures conformance
- Coordinates membership of the proposal review teams
- Prepares the appointed team for orals

The Volume Managers:

- Analyze the RFP for the assigned volumes
- Support Proposal Management Plan development
- Develop volume strategy(s) and create strategy statement(s) for assigned volumes
- Develop more specific section strategies and themes for applicable portions of the volume
- Create section theme statements
- Implement the compliance checklist for assigned volumes
- Implement the proposal outline for assigned volumes
- Prepare the writers' packages under the Proposal Manager's direction, including PDWs and any tailored guidance for a specific writer
- Train/lead writers in completing PDWs and mock-ups
- Write assigned proposal sections on schedule, following the agreed-upon proposal strategy and format
- Work under the direction of the Proposal Manager, maintaining open, clear communication channels

Proposal Specialist Personnel:

- Coach/train writers on sound proposal techniques (e.g. structure, themes, graphics, captions)
- Provide necessary templates and reuse materials for writers
- Establish a proposal work area
- Analyze the RFP
- Coordinate proposal schedule development and maintain visibility on progress
- Prepare the RFP compliance checklist and response matrix
- Work with individual proposal volume managers to create the proposal outline
- Develop the proposal style sheet and ensure conformance
- Coordinate proposal reviews
- Direct proposal production
- Write the Lessons-Learned Report

The Proposal Writers:

- Complete PDWs and create mock-ups for specified sections
- Comply with proposal guidance (e.g., bogies for page count and visuals, section organization, style sheets, section writing templates)
- Write assigned proposal section(s) on schedule, following the agreed proposal strategy and format
- Attend status meetings
- Advise proposal and/or volume managers of problems affecting assigned section(s)
- Develop subsequent section drafts according to feedback from review teams
- Complete section changes for final proposal revision

Technical Publications Personnel:

- Provide word processing and graphics support according to proposal style sheets
- Assist with formatting duties
- Provide editing support
- Maintain accurate backup files
- Produce final documents with integrated graphics according to the approved proposal format

Coordination Responsibilities

Intelligence Gathering

Team members should quickly gather as much intelligence as possible on the competition, and forward copies to the Proposal Manager.

External Information

All requests for information from various team members to teams should be routed through the Proposal Manager. The requester(s) should copy the responsible Team Manager on all information requests. All responses will be sent directly to the requester with appropriate copies sent to the Proposal Manager.

Review Teams

The Proposal Manager is responsible to identify and arrange participation of Team members. Once confirmed, the Proposal Operations Manager will coordinate the logistical details with the respective team members. Review dates are identified on the proposal development schedule. Notification will be sent to all team members as soon as possible. The Proposal Operations Manager will provide the facilities, equipment, and administrative support.

Team/Subcontractors

Truckwell of Alaska.

- Role and planned input: Supplying the distribution Components and Instrumentation
- Contact person(s): Greg Moose
- Coordination focal point: Conference calls/email

TAIT Custom Trailers

- Role and planned input: Build JOBOX to specs
- Contact person(s): Larry Johnson
- Coordination focal point: Conference Calls/email

PowerBlanket

- Role and planned input: Build custom heated blanket for totes
- Contact person(s): Corporate Sales Department
- Coordination focal point: Conference Calls/email

6.0 Proposal Operations

Proposal War Room

The location is the Kuparuk Industrial Complex Conference room.

Method of Operation

Daily communication with vendors and email to various project team members.

Storyboards

At meetings held at KIC conference room the available information will be distributed to the various team members through copies of all information.

Key Activities

The schedule included as Attachment 1: Writers' Information features activities, events, and milestones for the proposal development effort. Key activities are:

Event	Date
Kick-off Meeting	9/1/2014
Project Team Storyboards. Validate Strategies/Themes and Feature/Benefits	02/26/2015
Project TEAM Review	03/01/2015
Submittal of All Visuals	03/3/2015
Management Review	03/10/2015
Submittal of All Drafts	03/15/2015

In summary, based on the research performed and the qualifying information provided, the solution for providing ConocoPhillips Alaska with Diesel Exhaust Fluid Distribution System will consist of utilizing the products from three specific vendors. Truckwell of Alaska., will provide the components for the distribution system, the tote set up and instrumentation as well as the backup generator. TAIT Custom Trailers will provide JOBOX equipped with the necessary safety requirements, technical requirements and legal requirements as seen by the Alaska Department of Transportation. PowerBlanket will provide a supplemental heating system to ensure the Diesel Exhaust Fluid maintains the necessary temperature to uphold the integrity of the Diesel Exhaust fluid. These three vendors will work together to provide one trailer properly outfitted to perform the necessary task of distributing Diesel Exhaust Fluid. The product and performance record of these vendor's will be sufficient in providing ConocoPhillips Alaska with a solution fit to last several years of use and growth. All department head requirements, safety requirements and sponsor requirements can be achieved through working with each of these vendors to create one final product.

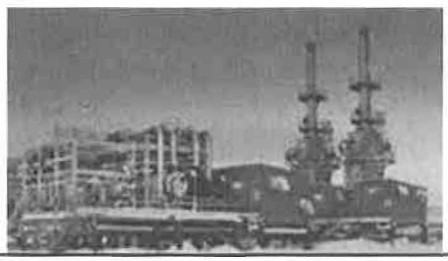
DIESEL EXHAUST FLUID (DEF) DISTRIBUTION SYSTEM RESEARCH AND RECOMMENDATION PROJECT

PM686B

MICHAEL MCDONOUGH

SPONSOR: CONOCO PHILLIPS FIELD SERVICES

Plan to include a researched recommendation proposal on specific vendors and products that will meet the needs and requirements of ConocoPhillips Alaska and the Greater Kuparuk River Unit.



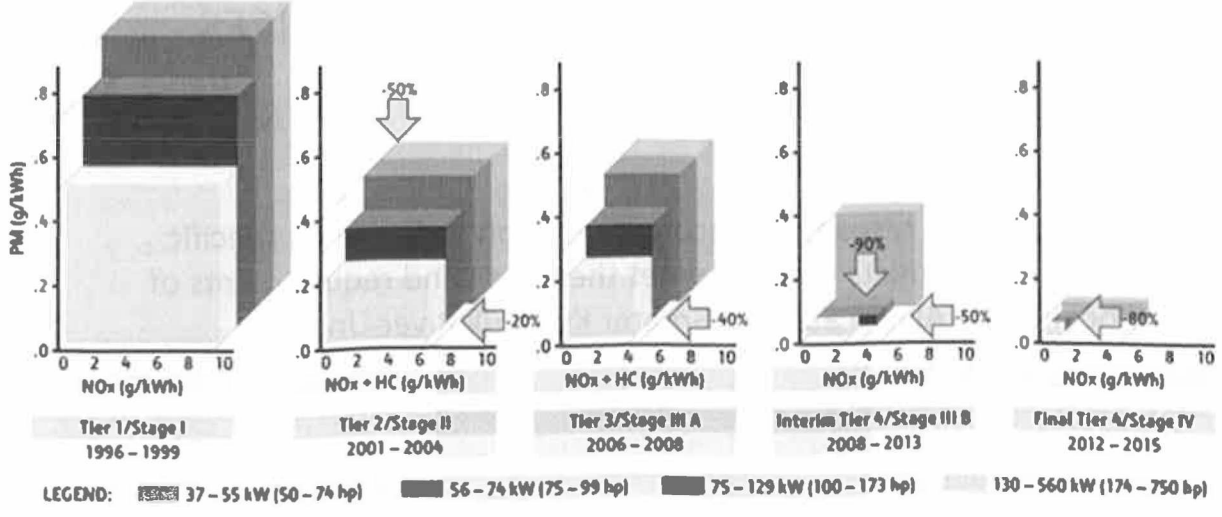
BACKGROUND INFORMATION ABOUT DEF

Since the EPA passed a diesel emissions reduction act in the 1990's, diesel engines have been produced in tiers with various methods to reduce their emissions.

Tier 1 engines were produced in the late 1990's, followed by tier 2 engines in the early 2000's and tier 3 engines after 2004.

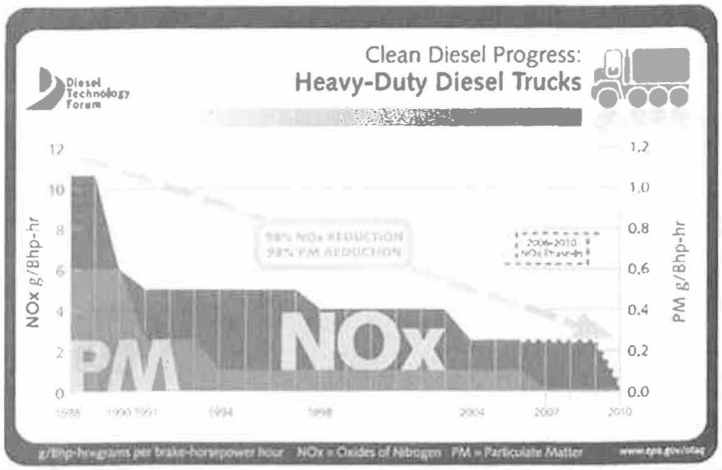
"2010 marked a milestone in the EPA's new regulations to reduce emissions with the mandatory production of tier 4 engines which reduced the initial diesel engines emissions in the tier 1 category by 100%."

EPA and EU nonroad emissions regulations: 37 – 560 kW (50 – 750 hp)



BACKGROUND INFORMATION ABOUT DEF

This is achieved by adding Diesel Exhaust Fluid to the emission system. The mixture is 32.5% ammonia and 67.5% deionized water.



PROJECT

Research and recommend a Diesel Exhaust Fluid Distribution System that meets the needs of the Kuparuk Field for the next several years.

AES: OPERATIONS AND MAINTENANCE

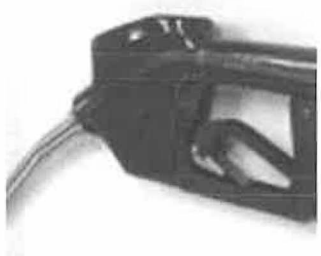
Conoco Phillips to purchase equipment for the distribution system

AES will supply operations and maintenance/upkeep

ConocoPhillips

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation

PROJECT CHALLENGES



Currently, there are no equipment manufacturers in the lower 48 who are designing and building DEF distribution systems with the arctic climate in mind. All equipment proposed for a bid will have to re-engineered by manufacturers to meet our unique needs.

PROJECT CHALLENGES

Large Storage Tanks have not yet been classified by the EPA on whether their classifications will fall under Oil and Gas or Agricultural stipulations regarding mass storage of Ammonia.

Currently, the largest quantities of DEF Kuparuk can purchase is in 330 gallon totes. There are no large distributors in Alaska. Also, no distributors are bringing it up in tankers.

PROJECT CHALLENGES

At this time, DEF must be stored in stainless steel vessels making tanker trucks too heavy to transport DEF (which also weighs nearly 9 lbs per gallon) up the haul road legally.

DEF freezes at 32 degrees F and turns to a gel at 12 degrees F

Even if DEF is maintained at a specified temperature, once it enters the distribution hose and nozzle, the extreme temperatures of the Arctic can freeze the DEF before it reaches its end point.

ALTERNATIVE SOLUTION MAY RENDER DEF OBSOLETE

Engine manufacturers are researching ways to get away from DEF since it has an added cost of about $3 per gallon.

There is an alternative engine being produced by MAXX FORCE that uses a particulate filter but initially the engine has failed to produce the performance required.

PROJECT RISK ASSESSMENT

While these challenges are unique, the project must move forward. Over 500 pieces of heavy equipment have been purchased and have started arriving and will continue to arrive over the next two years.

Current use of DEF is about 1000 gallons per month. Anticipated need in 5 to 10 years could reach as high as 5-6,000 gallons per day.

RESEARCH TOOLS

Researched online various products

Researched through other companies on the North Slope

Alpine, AIC, British Petroleum and AFC

Researched Vendors currently working with ConocoPhillips

Contacted ConocoPhillips Engineering Department heads

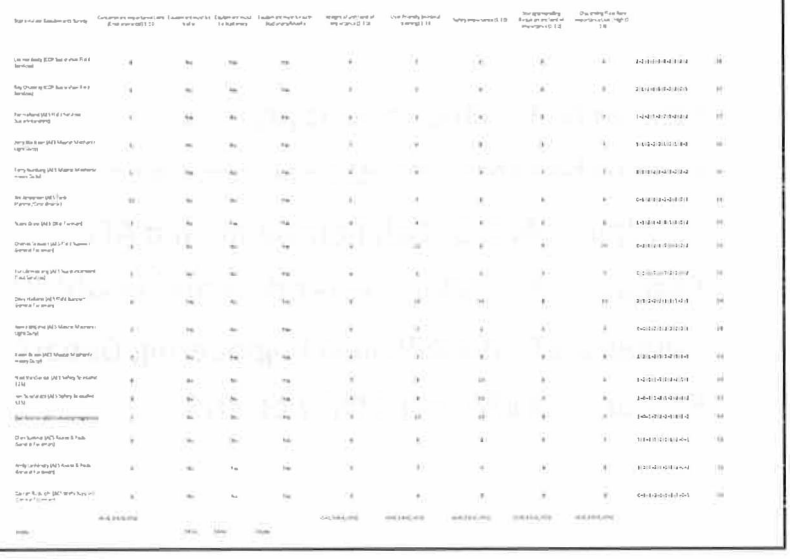
Researched EPA and DOE websites

RESEARCH METHODS

- Conducted meetings with department heads, project team mates and vendors via conference call.
- Started an email group specific to the project and distributed updates, status reports, vendor specs, proposals and drawings
- Took issues and concerns from vendors and department heads and researched solutions by interviewing the workers other companies and online resources

FINDING VALUE IN THE IMPORTANCE OF RESEARCH

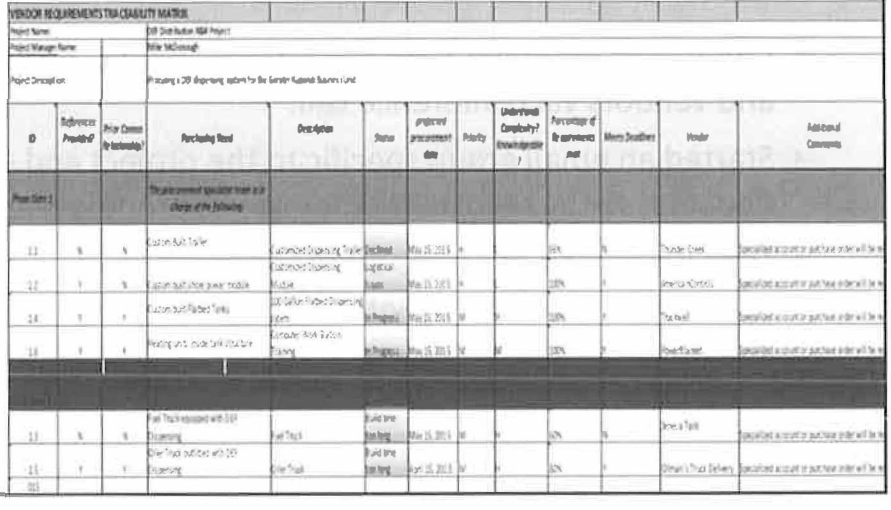
Survey results from all project team members and the sponsors. These results were then weighted in the power interest grid to determine the amount of research and time I should spend on researching various areas and requirements.



KNOWLEDGE AREAS

- Project Procurement Management
- Vendor Selection, Management Plan and Criteria

This Matrix was used to evaluate vendors. This is a small snap shot of the entire matrix that was used to determine if the project team should continue pursuing conducting business with a specific vendor.

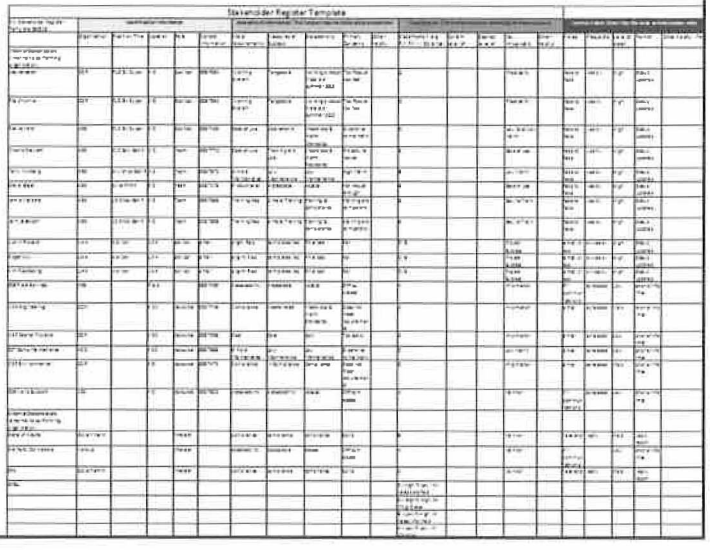


m1

KNOWLEDGE AREAS

- Project Communications Plan
- Matrix, Stakeholder Management, Method

This matrix was used to organize the project team and the sponsors contact information. Method of contact, frequency and main influence drivers were documented in this matrix.



KNOWLEDGE AREAS

- Project Time Management
- Project Team Management,
- Rotational Schedule Management
- Vendor Management and Criteria

The risk register was used to examine risks to the schedule and document mitigation strategies to the project.

Category	Risk Description	Probability (%)	Impact	Effect	Mitigation	Risk Response and Description	Owner	Status/Frequency	Date entered	Date to Review
Schedule	Communication between Hitch Changes	90%	14 days	High	PM Shall call in regularly with alternate while on R&R	Set up weekly email w/ PM's team	PM	4 days -6 17	6 10 2014	12 3 2014
Schedule	Information not retrieved while PM is on R&R	75%	20 days	High	PM Shall call in regularly with alternate while on R&R	Additionally use of other items of communication (i.e. email	PM	2 days - 3 21	6 10 2014	12 3 2014
Schedule	Decision Makers not on site at the right time	30%	7 days	Med	PM Use of Outlook for all meetings and appointments	Obtain authorization to contact while they are conducting business off site	PM	n a	6 10 2014	12 3 2014
Cost	Cost overruns can happen	25%	120 days	Low	Regular check ups with vendors on their proposals	Research shall include assessment of previous and new	PM	n a	6 20 2014	12 4 2014
Functions	Product can not meet all engineering requirements	84%	130 days	High	Research for better alternatives	Research shall include assessment of products and vendors	PM	1 -DEF Tester (The subcontract)	6 21 2014	12 5 2014
Logistics	Product can not arrive on time	50%	6 months	Med	Adjust project to allow for this risk	Draft proposals for alternative site locations	PM	n a	7 1 2014	12 6 2014
Schedule	Vendor does not response	28%	2 Months	Low	Use alternative or back up vendor	Drop vendor and use alternate vendors already researched	PM	n a	7 1 2014	12 6 2014
Cost	Vendor solution is too expensive	60%	1 month	High	Use alternative vendor	Drop vendor and use alternate vendors already researched	PM	n a	7 1 2014	12 6 2014
Schedule	Vendor can not deliver on time	30%	3 months	Med	Readjust schedule/use alternative vendor	Re-baseline the project with schedule Adjusted/use alternative vendor	PM	n a	6 8 2014	12 3 2014
Cost	Vendor will have to outsource engineering	80%	2 months	High	Readjust cost and re-baseline	Re-baseline project for cost and schedule or use alternative vendors	PM	n a	6 8 2014	12 3 2014
Cost/ Schedule	Vendor will have to redesign its work system	75%	8 months	High	Use alternative vendor/add change order	Re-baseline project for cost and schedule or use alternative vendors	PM	n a	6 10 2014	12 10 2014
Schedule	Vendor will not work with our system of doing business	15%	1 months	Low	Search for alternative ways to pay vendor or other system to use	Use alternative methods of late payment	Admin	n a	6 10 2014	12 10 2014
Cost	Shipping costs are too expensive	33%	1 months	Low	Use our own shipping vendors	Receive shipping quotes from vendors Compare already worked with	Sponsor	n a	6 10 2014	12 10 2014
Requirements	Vendor does not fulfill requirements	40%	6 months	Med	Use alternative vendor/re-baseline project schedule	Drop vendor and use alternate vendors already researched	PM	n a	6 11 2014	12 10 2014
Functions	Vendor's solution is outside of scope	25%	3 month	Low	Use alternative vendor/re-baseline project schedule	Re-baseline project for cost and schedule or use alternative vendors	PM	n a	6 18 2014	12 10 2014
Schedule	Vendor's solution initiate extra change orders	50%	1month	Med	Re-baseline project	Re-baseline project for cost and schedule or use alternative vendors	Committee agreement	n a	6 17 2014	12 10 2014
Schedule	Project Sponsor and team change personnel	75%	2 months	High	Re-baseline project to bring new personnel up to speed	Re-baseline project for schedule	Committee agreement	n a	6 16 2014	12 17 2014
Requirements	Requirements change through	80%	1month	Med	Submit change orders and	Use change order system and re-baseline if	Committee agreement	n a	6 17 2014	12 10 2014

Slide 17

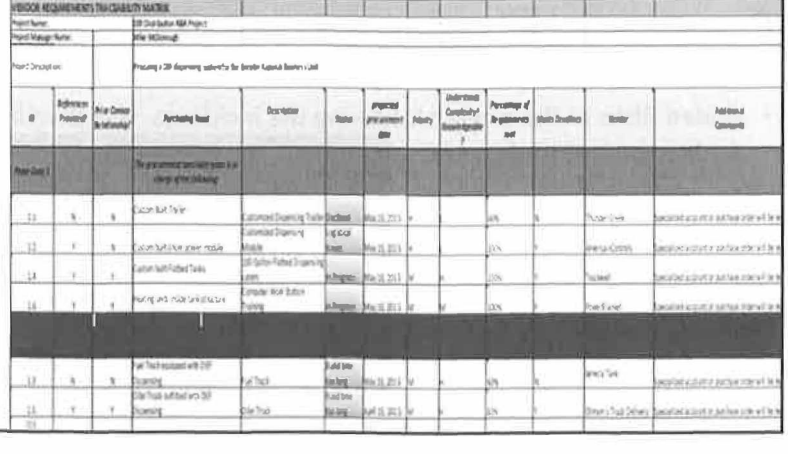
m1 mjmcdonough, 12/1/2014

KNOWLEDGE AREAS (TIME MANAGEMENT CONT'D)

Risk Mitigation Implemented and Executed	Date First Occurred	Date Last Occurred	Frequency	Probability (%)	Impact	Exposure	Mitigation	Risk Response and Description	Owner	Status/Frequency	Risk Mitigation Implemented ?	Impact To Project	Mitigation Successful?
Communication between Hitch Changes	10/14/2014	2/6/2015	4.00	90%	14 days	High	PM Shall call in regularly with alternate while on R&R	Set up work email at PM's home	PM	4 days -9/17	yes	16 days	yes
Information not relayed while PM Is on R&R	10/26/2014	1/16/2015	2.00	75%	20 days	High	PM Shall call in regularly with alternate while on R&R	Additionally use of other forms of communication i.e. email	PM	2 days - 9/21	yes	6 days	yes
Decision Makers not on site at the right time	1/25/2015	2/17/2015	2	50%	7 days	Med	PM Use of Outlook for all meetings and appointments	Obtain authorization to contact while they are conducting business off site	PM	n/a	yes	4 days	yes
Stakeholder moved to new position	1/30/2015	1/30/2015	1	25%	120 days	Low	PM shall schedule all necessary meetings immediately to inform team and new supervisor of the status of the project	Schedule additional meeting immediately to inform new supervisor	PM	n/a	yes	14 days	yes
Product can not meet all engineering requirements	11/14/2014	2/12/2015	4	66%	120 days	High	Research further for alternatives	Research shall include alternatives of products and vendors	PM	1 -DEF Trailer (Thundercreek)	yes	12 days	yes

KNOWLEDGE AREAS

- Project Quality Management
- Vender Verification Strategy, Product Knowledge and solutions based research in conjunction with department heads, project team members and knowledge area experts.



DELIVERABLE: RECOMMENDATION PROPOSAL

TAIT Custom Trailers
Anchorage, AK

American Controls Inc.
Farmington Hills, MI

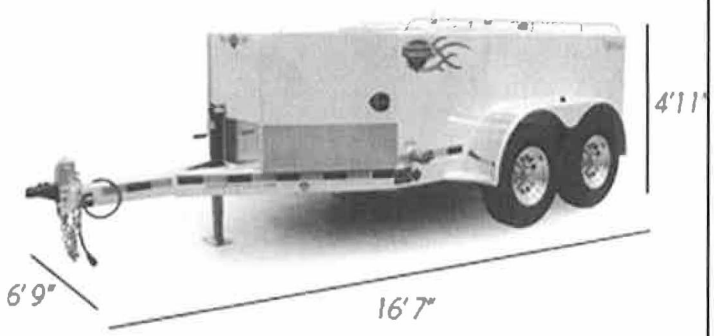
PowerBlanket
Alaska Branding
Anchorage, AK

RISK ANALYSIS MISTAKES

- Did not consider the current method of distributing DEF on the field as part of the project as a comparison guideline for analyzing the product until January 2015.
- Did not consider that the current system would have additional issues including two incident that happened within a week of each other and how that may impact the project. (Two loader punctures with poly tanks)
- Did not consider the current system would have any impact on the new system. I compartmentalized the two systems as totally separate.
- Added Risks to the project following the incidents. Reactive instead of proactive. Add to the lessons learned.

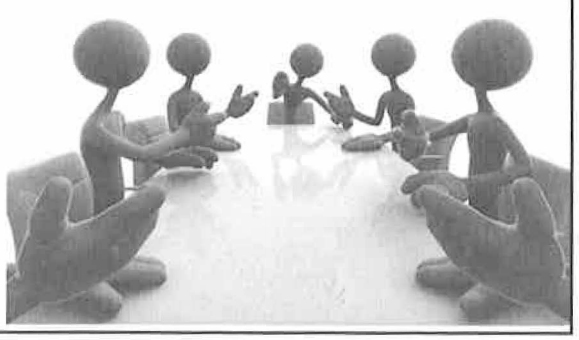
CUSTOM PROBLEM = CUSTOM SOLUTION

- The Trailer posed new risks for every solution
- Weight
- Axels
- Length
- Skill Level



CUSTOM PROBLEM = CUSTOM SOLUTION

- Reallocate Resources = Dissolving Project Team
- Too many hands in the pot
- Unique solution
- Needed a more timely solution

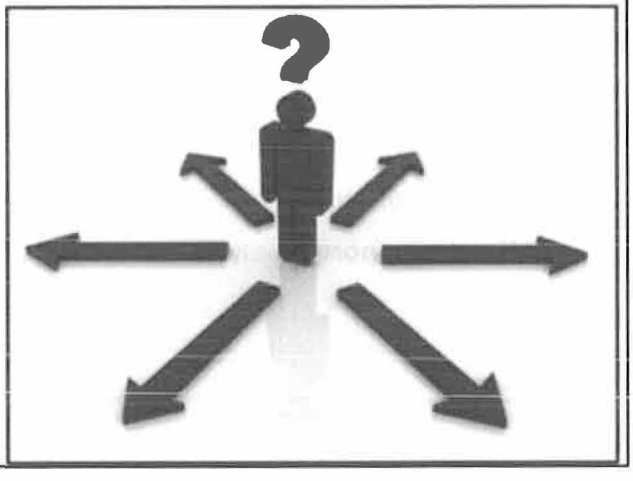


CUSTOM PROBLEM = CUSTOM SOLUTION

- Think outside the box by building a box
- It was clear what the sponsor kept leaning toward and wanted
- Unique solution
- Needed a more timely solution

CUSTOM PROBLEM = CUSTOM SOLUTION

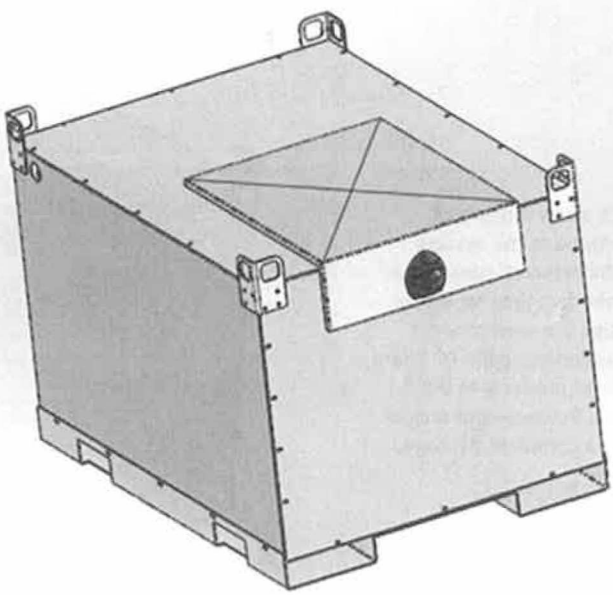
- The sponsor wanted another fleet vehicle but not enough time
- Sponsor had to be reminded what they really wanted
- A short term solution was proposed
- Custom build/JOBOX outfitted with a DEF tank



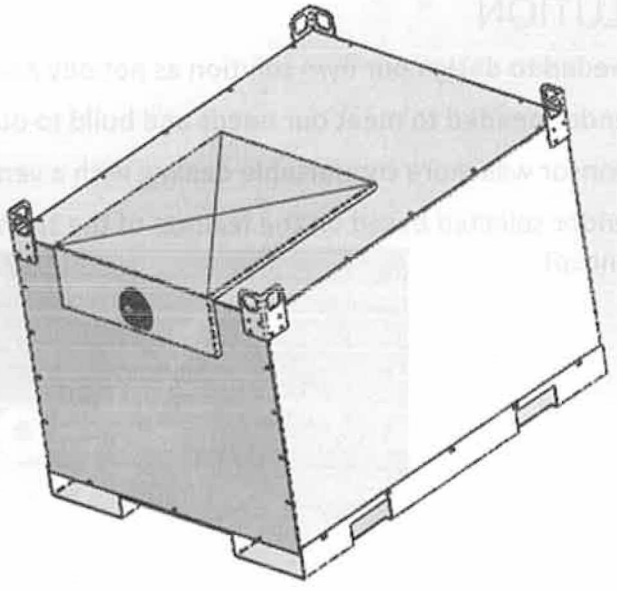
SOLUTION

- Needed to design our own solution as nobody had our solution available
- Vendor needed to meet our needs and build to our concept
- Sponsor was more comfortable dealing with a vendor they regularly use
- Vendor selected based on the feelings of the sponsor for a new custom concept

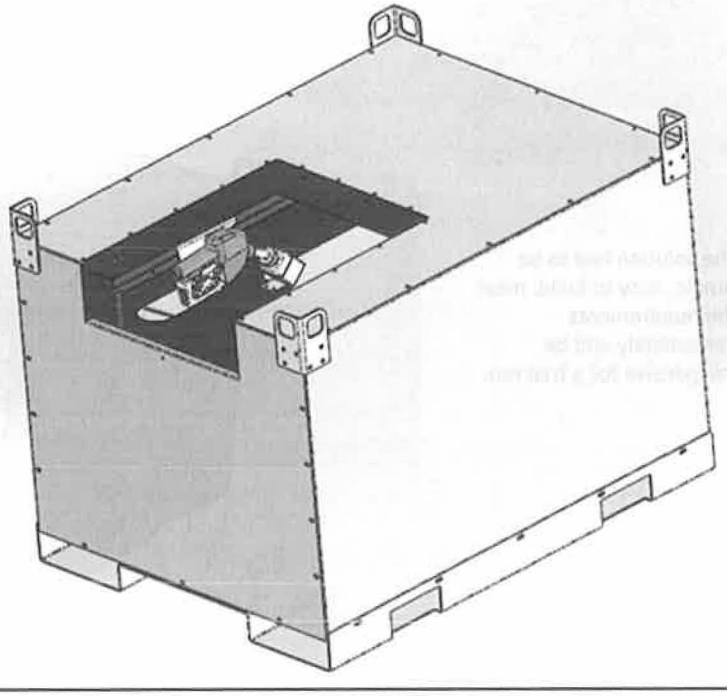
The solution had to be simple, easy to build, meet the requirements immediately and be inexpensive for a trial run.



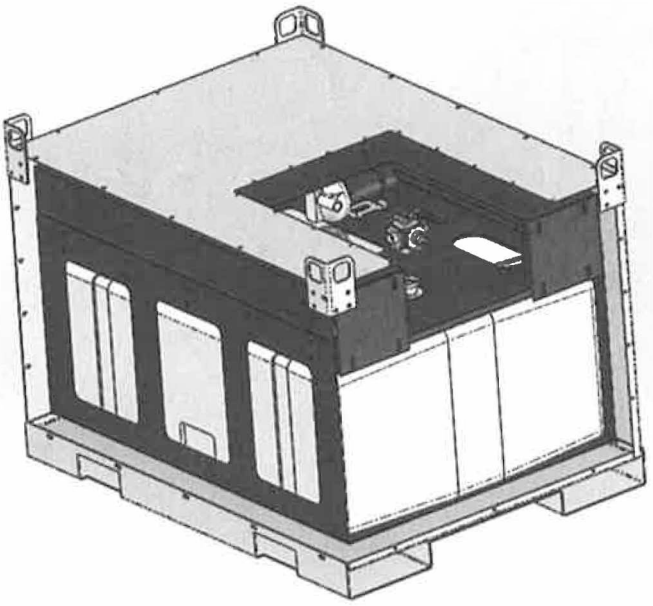
Had to be mobile, encased with double containment and protected from our operators and the elements.



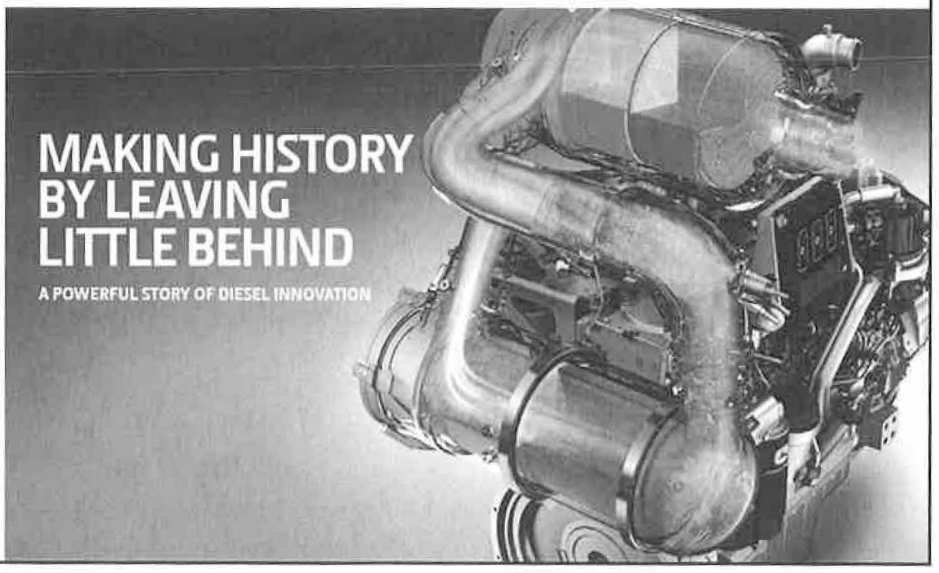
This product was a mixture of everything found in the market place. All the research conducted pointed to the fact that we would have to design our own concept and find someone to build it. There are many great products in the market place, however, not one of them was in a complete package.



Innovation, risk analysis, requirements, communication matrices, vendor analysis, stakeholder management, procurement management, time management, cost management, scope management, schedule management, quality management, resource management and integration management combined produced a product that satisfied the sponsor, the project team and the project itself. No gold plating, but this product delivers a solution and product essential to the field that meets all requirements.



QUESTIONS AND ANSWERS?



Michael McDonough

PM 686A

Summary of Lessons Learned

12/8/2014

Diesel Exhaust Fluid Distribution System Research and Recommendation Project

Lessons Learned

There were many issues regarding this project which were not originally captured in the risk register when the project rolled out in September 2014. When the project team was being assigned, many experts were added to the project as part of the project team to come up with a solution regarding a DEF distribution system at Kuparuk. When the team was formed, the personnel assigned to the project team were very qualified and very knowledgeable, however due to the nature of the work schedules on the North Slope being rotational, this made for a lot more issues in organizing and disseminating knowledge between the groups. Additionally, while one subject matter expert from a given department had valid ideas and viewpoints, being on a rotation, the alternate did not always agree and viewed the issue at hand from a very different view point. As the project progressed, this deficiency posed more threat to the project's success than it did to help the project proceed on schedule. Some subject matter experts over the course of the project were reassigned to other tasks outside of the project in an effort to keep one project team together and helping deal with opposing viewpoints on opposite shifts.

Eliminating the project team members on the opposing rotation quickened the transfer of knowledge and exchange of information down to a more manageable level that was more conducive to the project goals and progress. If this had been implemented much earlier in the project it would have done a lot to eliminate scope creep and adding more time for decision making in the direction the research and project could proceed.

As Project Manager, a personal lessons learned was that I needed to be more forceful and diligent about staying within scope. Controlling the scope in this project was essential to its success. There are many ideas and opinions from several subject matter experts on what the project should do and how it should progress. While their input is valid and essential to the project, as project manager it is my duty to make sure that all ideas discussed and investigated were done in a manner that propels the project forward. To do this, I needed to be much more firm about where the project was and in which direction the project needed to go. I did this closer to the end of the project, but it was a

definitely a lessons learned opportunity that in the future for all other projects will be incorporated from the point of kick off.

Corporate priorities with the project from the beginning were not defined as well as I needed to ensure the timely execution of the project. More than anything, by not defining the corporate priorities such as size, cost, complexity from the beginning, it allowed for scope creep and I was constantly battling the progress of the project to maintain a steady course and to stay on task. The difficult part in this was that it was not that I wasn't asking the right questions but more that the sponsors wanted progress on the project without clearly defining exactly what they wanted. The project at this point, which was early in the project, had to shift from a procurement project into a research project. It had to be redefined through scope and tasks to accommodate a more research oriented project. The reason that this took place was that we were dealing with a totally new concept and product in which there was not a lot of information or products readily available for testing. The project team had difficulty not being able to test a new product and dealing with an entirely new project. Most projects performed on the North Slope may vary slightly but they are usually improvements on existing systems.

Communication was essential to this project as we dealt with many different vendors and experts from around the entire North Slope. While I kept a communication log, a communication plan and strategy, and while successful, this was information that should have been shared more regularly with subject matter experts at meetings. The communication matrix and contact information should have been shared at meetings to foster my knowledge sharing and to get more help from the project team. It would have allowed me to as the project manager to focus on other aspects of the project rather than being the sounding board and dispatch for contact information especially when it came to dealing with several different vendors.

When dealing with several different vendors, communicating with them and giving them specific deadlines would have helped. Giving deadlines on engineering controls, product modifications and the ability to do what the customer wanted would have greatly helped the project progress much faster. Often times the project was stalled or research and questions went unanswered because vendors could simply not keep up with our project schedule. Often times a vendor would not respond meaning that they could do what we needed them to do for the project. Requiring deadlines and seeing if vendors were willing and able to keep up would have greatly helped speed along the project. If they could not meet the deadline and after further attempts to contact, they were not replying to phone calls and emails, we could have cut our losses faster and moved on to other vendors more willing to meet our requirements and project goals.

When the project reached a point where we knew there was going to be several products involved, once we found one of the major components and products, it would have been beneficial to work on that one product in its entirety until we knew we had that one product specified in great detail before trying to work with other vendors with incomplete or missing information. There are several different products that compose the final make-up of the product. Finalizing one aspect of the final product and then moving on to the other vendors would have been much more beneficial to the project in moving it forward and reaching delays.

In my risk assessment I failed to use the current system in place as a way to measure a new system. I did not take into account that the current system the project was looking to replace would impact the system I was researching or making an attempt to replace. The current system had great implications on the new system we were looking at researching. Two incidents involving a loader puncturing the bottoms of poly totes caused the sponsor to decide not to go with poly tanks any longer. This had great implications on the project in switching the types of totes we ordered. Poly totes came in 330 gallon quantities while stainless steel totes came in 275 gallon quantities and called for whatever we looked at buying to be protected from the outside from punctures of loaders. This added new requirements to the project that were not previously considered before.

I had to take charge of the project by reminding the project sponsor of what the requirements were and what he truly wanted. I had to remind him not to listen to others who wanted gold plating or had some other agenda to steer or drive the project. By conducing several meetings with the project sponsor I was able to keep him on track and by using supporting data and analysis was able to persuade him of what we needed to get back to doing with the project.

Michael McDonough

PM686B Deliverables

Knowledge Areas

4/28/15

KNOWLEDGE AREAS

Knowledge Area Selection

Project Procurement Management:

This project is unique. It has not been done before. The DEF product, while being used currently, has not been dispensed in such a large area in such extreme temperatures. Currently, manufacturers have listened to our needs and requirements and are having to engineer out the unique specifications we need here on the slope. Success will be monitored by finding a product and manufacturer who is willing and able to meet our proposed needs and be able to deliver a product to our location by a specified time. A matrix will be created listing out the capabilities and dependability on these vendors as part of our decision making process.

Project procurement success will be measured in accordance with how much it will meet the project requirements. Procurement will be based on the research and work done with the vendors to propose a system that meets all legal, engineering and environmental needs as well as meeting the mobility needs of the sponsor. The target of the procurement end of the project is to meet as many traceable requirements as possible so the sponsor can make a well educating decision for which system to buy. If the sponsor has inadequate information, then the sponsor cannot make the best decision with the company's strategic goals in mind. This would result in a failure of this process.

The procurement management portion of this project has already been expanded in meeting with several different vendors and distributors. Additionally, since whichever product will be selected, it must be engineered to meet our specific needs since current products are being manufactured in the continental United States and do not have the harsh arctic climate as a factor in their current designs. Language and terminology has been a factor in communication between parties as the language used in describing the possible units for purchase must align to ensure a product will be built to the client's needs. A matrix has been constructed to ensure the vendor can meet the requirements with the understanding of the client's needs. The matrix will determine if the vendor is of quality and taking into account all the requirements. Not only will requirements and quality be essential to the decision making process but performance on time to completion will be a factor.

After several meetings and attempts to acquire bids from various vendors the sponsor agreed to give vendors, moving forward, a deadline to respond with bids. The real evaluation of this project's success is being measured by schedule performance as a clear and concise budget has not been revealed by the sponsor.

Project Communications Management:

Many different departments will be involved in the process. ConocoPhillips, AES Field Services, AES Heavy Shop and AES Field support are the main departments most heavily involved in this project. As this project includes operations, maintenance, procurement, training, and assessments; communications between all departments is essential to ensure that the product being purchased, meets everyone's needs. This poses a unique challenge as all possible systems that may be used and purchased will be new to the industry to meet our unique needs.

Communications will be measure with the vendors and project team based on frequency and adherence to requirements in the proposals submitted by the vendor. If the vendor fails to understand the requirement and bids are received on the grounds of misunderstanding, then this aspect of the project will fail. Ideally the vendors will be able to produce schematics, proposals and bids based upon traceable requirements by the team and sponsor that align with the company's strategic goals.

Communication has been the largest impact on this project. With several department heads as part of the team, various engineers and environmental personnel being involved, importance and stresses on specific verbiage has been a factor in making sure every department has the same understanding of the product desired. Additionally, communicating the various verbiage used between team members to the vendor and ensuring the same understanding of the requirements has been a challenge. Terminology utilized for specific requirements has been the weak point in the communication process. To mitigate this issue a dictionary of key terms and verbiage has been composed and will be expanded. The dictionary describes which vendor or party uses what terminology and what the different terminology has as an emphasis on importance.

A communication matrix is currently being constructed and updated as project progress teaches the team how best to communicate with various stake holders ad by what methodology.

Additional meetings have been scheduled to bring the new Sponsor up to date and briefed about the project. The Alternate Sponsor has taken a more direct lead and control over the decision making process for this project. Additionally, the request to allow me a specific resource and maintain contact with that individual has been successful at keeping the project on track and moving forward. Presentation of materials from this course and plan have been successful in convincing the sponsor to adhere to the recommendations and advice from the project team.

Project Time Management:

This project must meet time requirements as it is essential that a system be put in place by summer 2015. This poses a unique challenge as all manufacturers of various products are in the Continental United States and must get their products engineered, manufactured and shipped to the North Slope in a timely fashion. Vendor's capability of meeting this requirement will be assessed in the vendor matrix.

Time is a factor in this project. If all requirements and proposals conducted by the project team and vendors cannot be completed on time, then the sponsor will not be able to make a decision on which project to buy and what products will align with the company's strategic goals. If the vendors have enough information to produce a proposal that meets the requirements in the allotted time of the project then the project will be a success.

Time has been a factor. As the project progresses, the need for the various team members to take on more responsibility and roles has increased. To combat time constraints reallocation of resources has been utilized. As the team is on rotational schedules and time is limited on what they can spend on this project, the need to involve various team members in having direct contact with the vendor is needed. The lessons learned document will reflect these resource reallocations for future study and reference.

If the project meets its deliverables by the client reaching a decision on which vendor and which product to purchase by December 1st 2014, the time management and re-allocation of resources would have been successful. If it does not, the project will be delayed. Requiring vendors to adhere to our time constraints for receiving bids has helped tremendously in moving the project forward on schedule and staying on target.

Reallocating the project team back to their regular work functions was most beneficial in keeping the project on track. With so many people involved in the project, the different ideas and opinions was causing the project to creep out of scope or to slow its progress by examining different avenues. Focusing on the project and reducing the team to just myself and a technical expert allowed us to focus on the

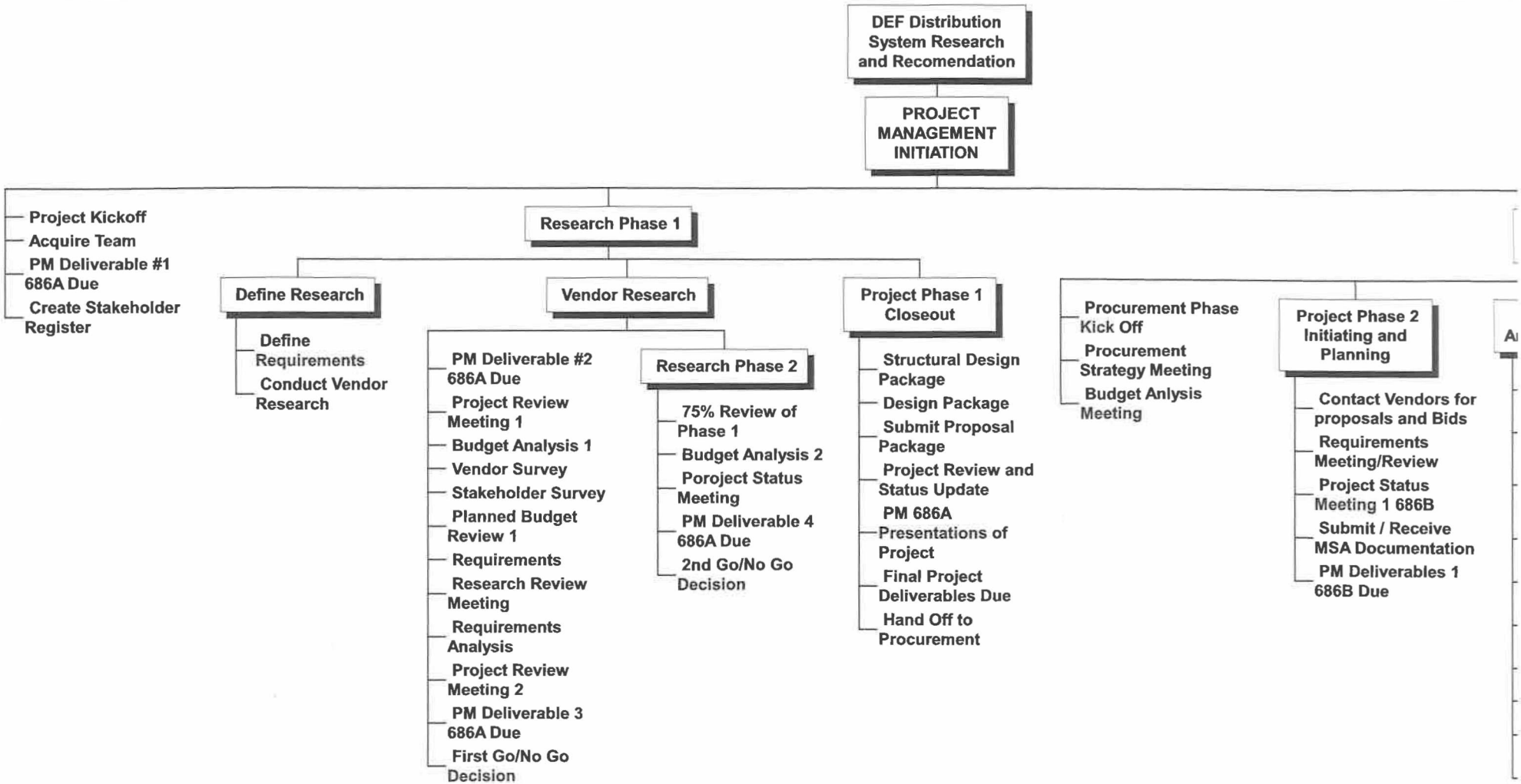
Project Quality Management:

As this is a new project with new requirements unique to our extremes quality is essential. The need for a robust system that does not fail in harsh climates is also a unique challenge. The product must be easily set up for our maintenance requirements here on the North Slope. Quality will be determined by the quality of bids with engineering specifications that meet our requirements. It will also be assessed in accordance with performance on the North Slope while out in the field which will come at a later phase in the project. Quality cannot be compromised in this project as there are unique environmental control factors in the location in which it will be used. In the vendor matrix, it will determine the level to which the manufacturer can meet the requirements.

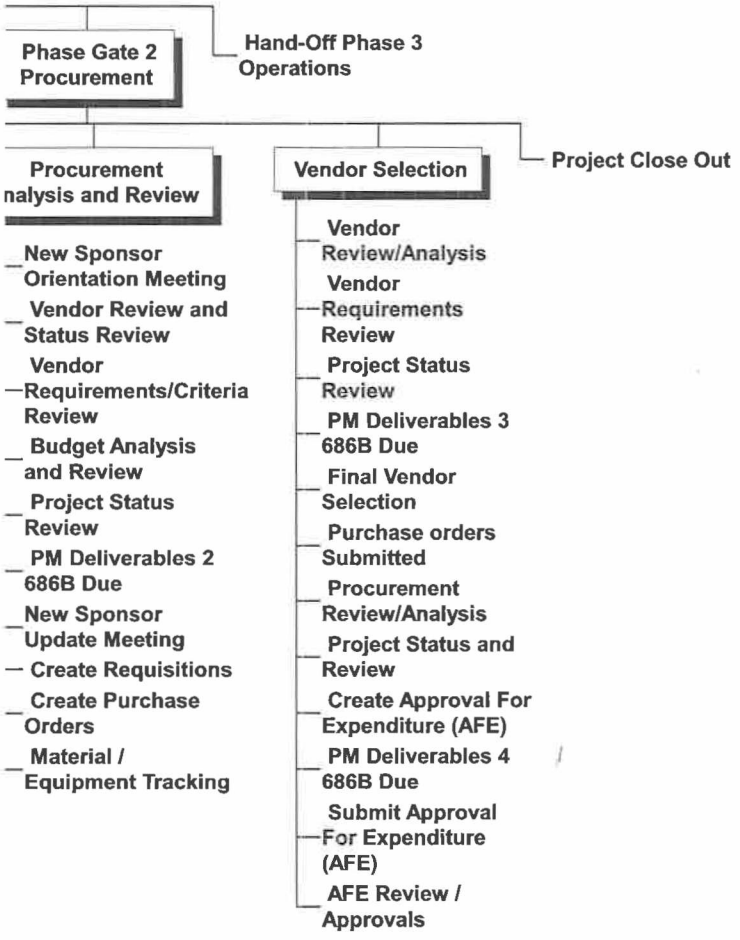
Quality management is essential to the project. The project is producing research and recommendations and the research and recommendations must be sufficient enough to provide enough information on traceable requirements for the sponsor to make strategic decision that meets the needs of the company's strategic goals. The target is to provide the sponsor with relative and exact information that a decision can be reached that supports the project's goals.

Quality management has been a factor in this project. As the system desired by ConocoPhillips is a new system and never been built for the conditions of the extreme arctic, quality in communication, time management and in requirements has required the construction of several matrices to ensure all stakeholders have their needs met. Quality is a factor in every element of this project to ensure the information and processes used to obtain the information are going to satisfy the client's expectations.

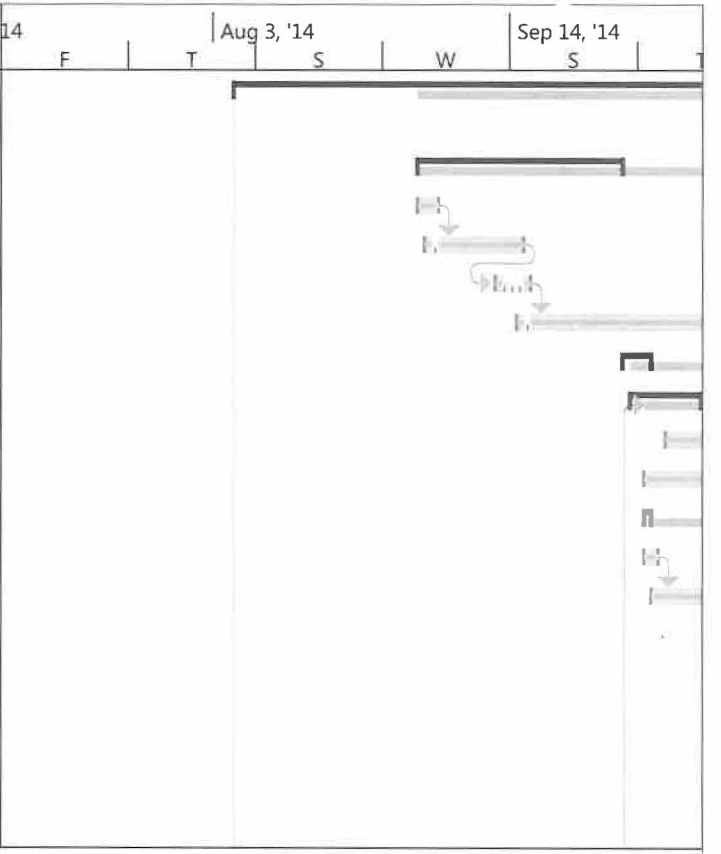
Quality will best be measured with discussions with the client. If the client's requirements are satisfied, then the quality aspect of this project will be satisfied. Quality in communications with vendors and ensuring we are on the same page has been enhanced with more stakeholder and sponsor involvement in conference calls with the vendor. The vendors are better able to understand our needs and requirements and know exactly what the sponsor is asking for.


DEF Distribution System Research and Recomendation
PROJECT MANAGEMENT INITIATION
Project Kickoff
Acquire Team
PM Deliverable #1 686A Due
Create Stakeholder Register
Research Phase 1
Define Research
Define Requirements
Conduct Vendor Research
Vendor Research
PM Deliverable #2 686A Due
Project Review Meeting 1
Budget Analysis 1
Vendor Survey
Stakeholder Survey
Planned Budget Review 1
Requirements
Research Review Meeting
Requirements Analysis
Project Review Meeting 2
PM Deliverable 3 686A Due
First Go/No Go Decision
Research Phase 2
75% Review of Phase 1
Budget Analysis 2
Poroject Status Meeting
PM Deliverable 4 686A Due
2nd Go/No Go Decision
Project Phase 1 Closeout
Structural Design Package
Design Package
Submit Proposal Package
Project Review and Status Update
PM 686A
Presentations of Project
Final Project Deliverables Due
Hand Off to Procurement
Procurement Phase Kick Off
Procurement Strategy Meeting
Budget Anlysis Meeting
Project Phase 2 Initiating and Planning
Contact Vendors for proposals and Bids
Requirements Meeting/Review
Project Status Meeting 1 686B
Submit / Receive MSA Documentation
PM Deliverables 1 686B Due

686B Project Final



ID	WBS	Task Mode	Task Name	% Complete	Baseline Start
1	1		**DEF Distribution System Research and Recomendation**	**100%**	**Wed 8/6/14**
2	**1.1**		**PROJECT MANAGEMENT INITIATION**	**100%**	**Mon 9/1/14**
3	1.1.1		Project Kickoff	100%	Mon 9/1/14
4	1.1.2		Acquire Team	100%	Tue 9/2/14
5	1.1.3		PM Deliverable #1 686A Due	100%	Fri 9/12/14
6	1.1.4		Create Stakeholder Register	100%	Mon 9/15/14
7	**1.1.5**		**Research Phase 1**	**100%**	**Tue 9/30/14**
8	**1.1.5.1**		**Define Research**	**100%**	**Wed 10/1/14**
9	1.1.5.1.		Define Requirements	100%	Mon 10/6/14
10	1.1.5.1.		Conduct Vendor Research	100%	Fri 10/3/14
11	**1.1.5.2**		**Vendor Research**	**100%**	**Fri 10/3/14**
12	1.1.5.2.		PM Deliverable #2 686A Due	100%	Fri 10/3/14
13	1.1.5.2.		Project Review Meeting 1	100%	Sat 10/4/14
14	1.1.5.2.		Budget Analysis 1	100%	Tue 10/14/14
15	1.1.5.2.		Vendor Survey	100%	Tue 10/14/14
16	1.1.5.2.		Stakeholder Survey	100%	Mon 10/20/14
17	1.1.5.2.		Planned Budget Review 1	100%	Sat 11/1/14
18	1.1.5.2.		Requirements	100%	Mon 10/20/14
19	1.1.5.2.		Research Review Meeting	100%	Sat 11/8/14

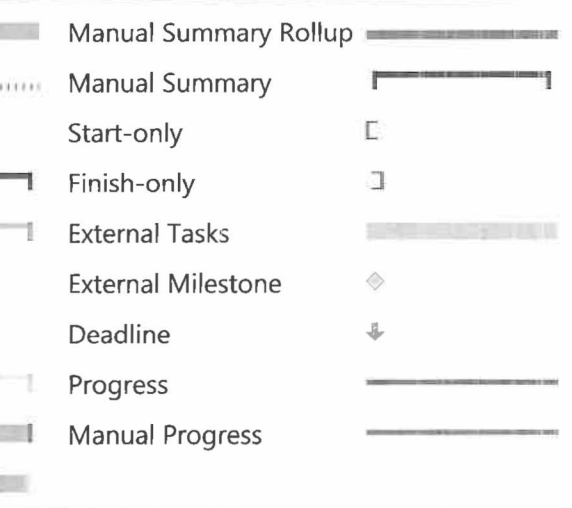


Project: DEF Distribution 686B Pro
Date: Wed 4/29/15

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only

Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

ID	WBS	Task Mode	Task Name	% Complete	Baseline Start
20	1.1.5.2.		Requirements Analysis	100%	Tue 11/11/14
21	1.1.5.2.		Project Review Meeting 2	100%	Wed 11/12/14
22	1.1.5.2.		PM Deliverable 3 686A Due	100%	Fri 10/24/14
23	1.1.5.2.		First Go/No Go Decision	100%	Fri 10/24/14
24	**1.1.5.2.**		**Research Phase 2**	**100%**	**Wed 11/12/14**
25	1.1.5.2.		75% Review of Phase 1	100%	Wed 11/12/14
26	1.1.5.2.		Budget Analysis 2	100%	Tue 11/18/14
27	1.1.5.2.		Poroject Status Meeting	100%	Wed 11/19/14
28	1.1.5.2.		PM Deliverable 4 686A Due	100%	Fri 11/21/14
29	1.1.5.2.		2nd Go/No Go Decision	100%	Fri 11/21/14
30	**1.1.5.3**		**Project Phase 1 Closeout**	**100%**	**Sat 11/22/14**
31	1.1.5.3.		Structural Design Package	100%	Mon 11/24/14
32	1.1.5.3.		Design Package	100%	Sat 11/22/14
33	1.1.5.3.		Submit Proposal Package	100%	Mon 11/24/14
34	1.1.5.3.		Project Review and Status Update	100%	Tue 11/25/14
35	1.1.5.3.		PM 686A Presentations of Project	100%	Tue 12/2/14
36	1.1.5.3.		Final Project Deliverables Due	100%	Tue 12/9/14
37	1.1.5.3.		Hand Off to Procurement	100%	Wed 12/10/14



Project: DEF Distribution 686B Pro
Date: Wed 4/29/15

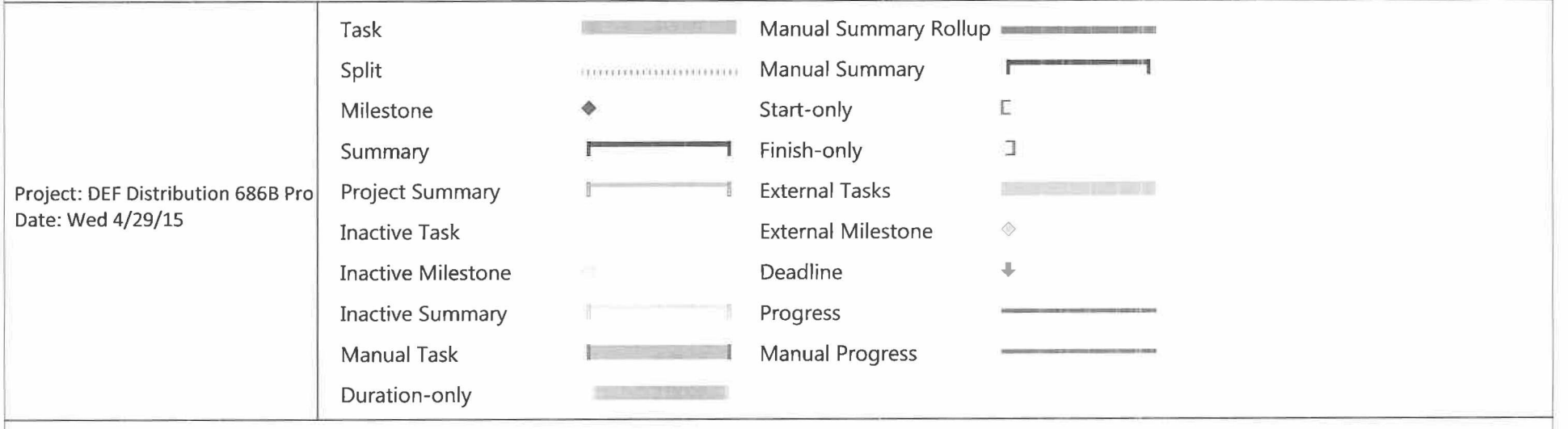
Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

ID	WBS	Task Mode	Task Name	% Complete	Baseline Start
38	**1.1.6**		**Phase Gate 2 Procurement**	**100%**	**Mon 1/5/15**
39	1.1.6.1		Procurement Phase Kick Off	100%	Mon 1/5/15
40	1.1.6.2		Procurement Strategy Meeting	100%	Tue 1/6/15
41	1.1.6.3		Budget Anlysis Meeting	100%	Wed 1/7/15
42	**1.1.6.4**		**Project Phase 2 Initiating and Planning**	**100%**	**Mon 1/12/15**
43	1.1.6.4.		Contact Vendors for proposals and Bids	100%	Tue 2/3/15
44	1.1.6.4.		Requirements Meeting/Review	100%	Mon 2/2/15
45	1.1.6.4.		Project Status Meeting 1 686B	100%	Sun 2/1/15
46	1.1.6.4.		Submit / Receive MSA Documentation	100%	Mon 2/2/15
47	1.1.6.4.		PM Deliverables 1 686B Due	100%	Fri 2/6/15
48	**1.1.6.5**		**Procurement Analysis and Review**	**100%**	**Mon 2/9/15**
49	1.1.6.5.		New Sponsor Orientation Meeting	100%	Fri 2/20/15
50	1.1.6.5.		Vendor Review and Status Review	100%	Tue 2/10/15
51	1.1.6.5.		Vendor Requirements/Criteria Review	100%	Wed 2/11/15

Project: DEF Distribution 686B Pro
Date: Wed 4/29/15

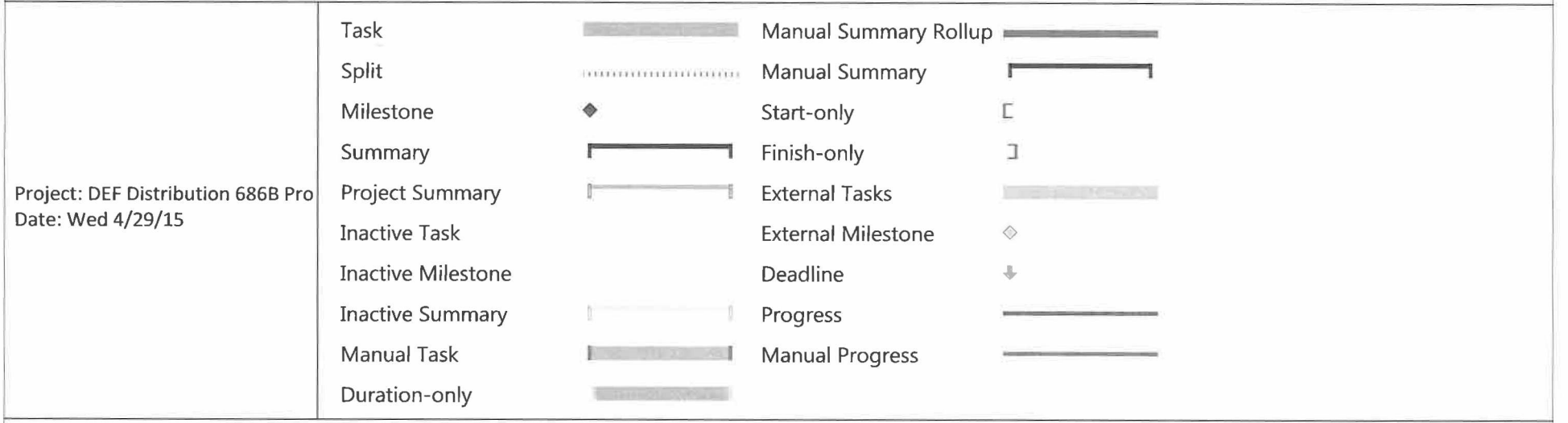
Task		Manual Summary Rollup	
Split		Manual Summary	
Milestone		Start-only	
Summary		Finish-only	
Project Summary		External Tasks	
Inactive Task		External Milestone	
Inactive Milestone		Deadline	
Inactive Summary		Progress	
Manual Task		Manual Progress	
Duration-only			

ID	WBS	Task Mode	Task Name	% Complete	Baseline Start
52	1.1.6.5.		Budget Analysis and Review	100%	Thu 2/12/15
53	1.1.6.5.		Project Status Review	100%	Fri 2/13/15
54	1.1.6.5.		PM Deliverables 2 686B Due	100%	Fri 2/27/15
55	1.1.6.5.		New Sponsor Update Meeting	100%	Wed 2/25/15
56	1.1.6.5.		Create Requisitions	100%	Tue 2/17/15
57	1.1.6.5.		Create Purchase Orders	100%	Tue 3/31/15
58	1.1.6.5.		Material / Equipment Tracking	100%	Wed 4/1/15
59	**1.1.6.6**		**Vendor Selection**	**100%**	**Mon 3/16/15**
60	1.1.6.6.		Vendor Review/Analysis	100%	Tue 3/17/15
61	1.1.6.6.		Vendor Requirements Review	100%	Wed 3/18/15
62	1.1.6.6.		Project Status Review	100%	Thu 3/19/15
63	1.1.6.6.		PM Deliverables 3 686B Due	100%	Fri 3/20/15
64	1.1.6.6.		Final Vendor Selection	100%	Mon 4/6/15
65	1.1.6.6.		Purchase orders Submitted	100%	Mon 4/6/15
66	1.1.6.6.		Procurement Review/Analysis	100%	Fri 4/10/15
67	1.1.6.6.		Project Status and Review	100%	Sun 4/12/15
68	1.1.6.6.		Create Approval For Expenditure (AFE)	100%	Mon 4/13/15
69	1.1.6.6.		PM Deliverables 4 686B Due	100%	Fri 4/10/15



Project: DEF Distribution 686B Pro
Date: Wed 4/29/15

ID	WBS	Task Mode	Task Name	% Complete	Baseline Start
70	1.1.6.6.		Submit Approval For Expenditure (AFE)	100%	Mon 3/16/15
71	1.1.6.6.		AFE Review / Approvals	100%	Mon 4/6/15
72	1.1.6.7		**Project Close Out**	100%	**Tue 4/14/15**
73	1.1.7		Hand-Off Phase 3 Operations	100%	Tue 4/28/15



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Split		Manual Summary	
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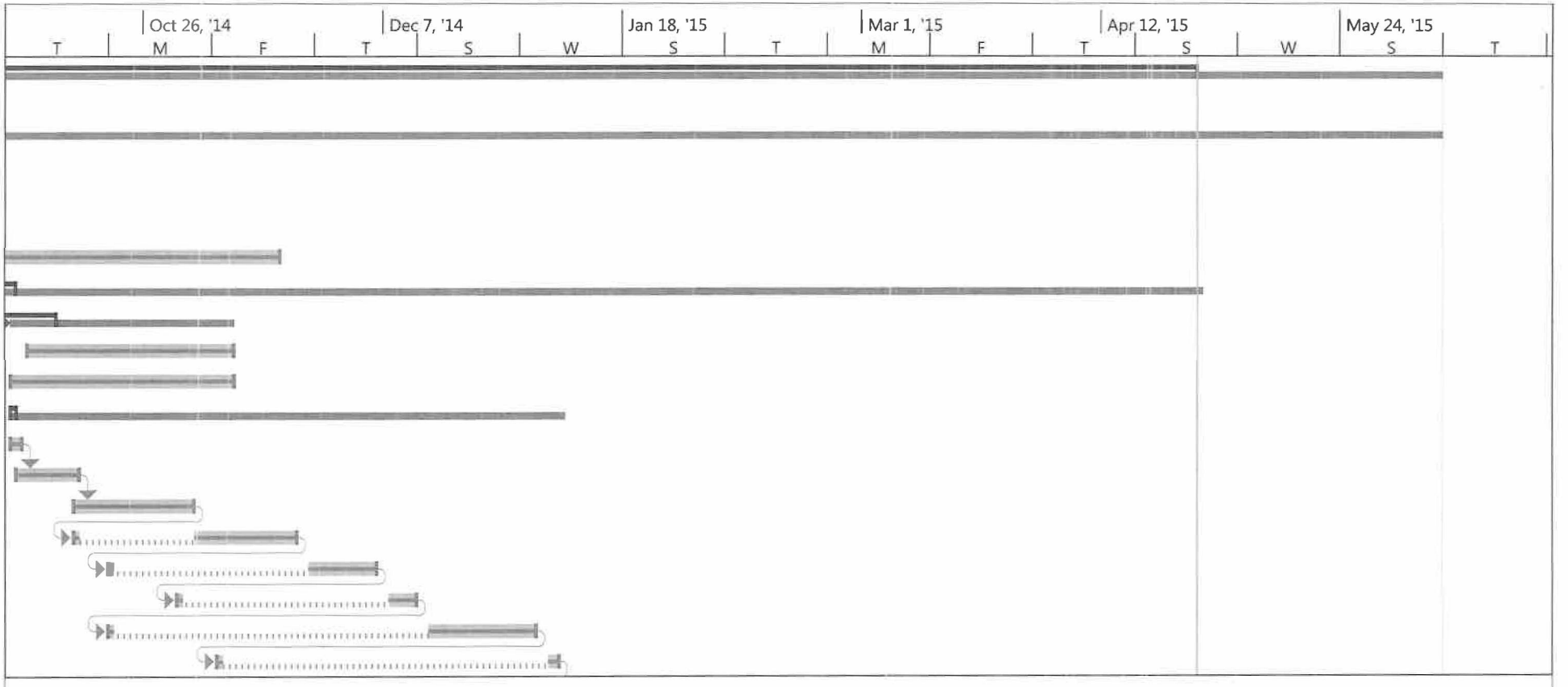
Project Summary		External Tasks	
Inactive Task		External Milestone	
Inactive Milestone		Deadline	
Inactive Summary		Progress	
Manual Task		Manual Progress	
Duration-only			



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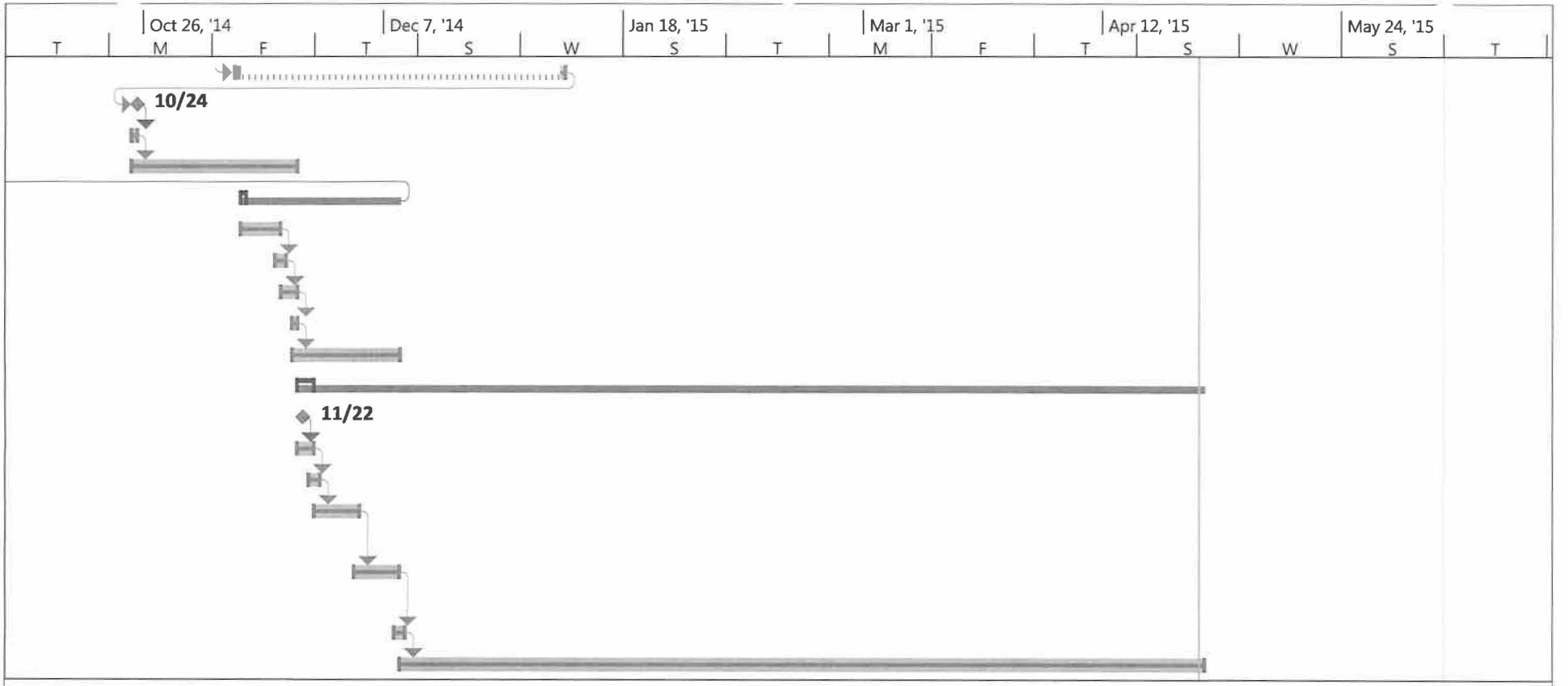
Duration-only			



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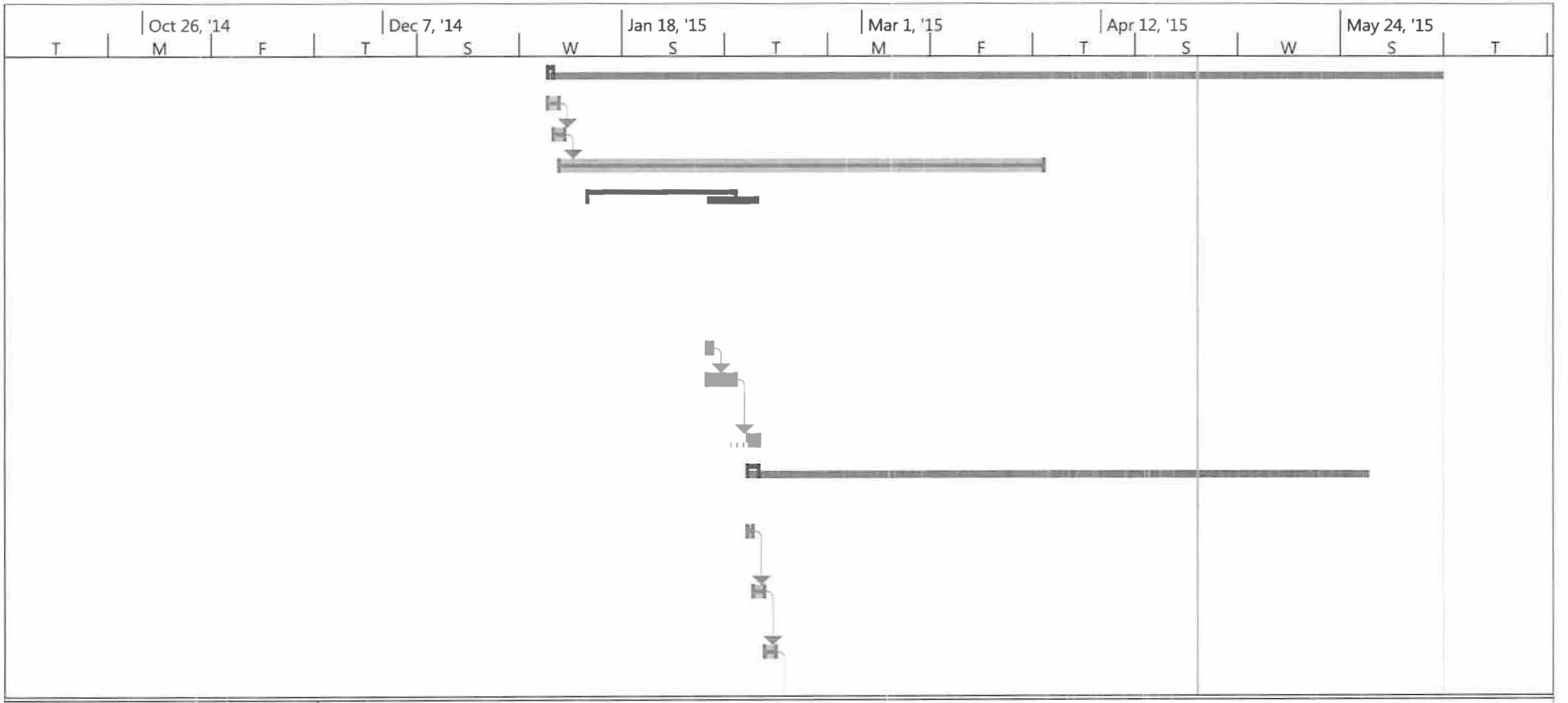

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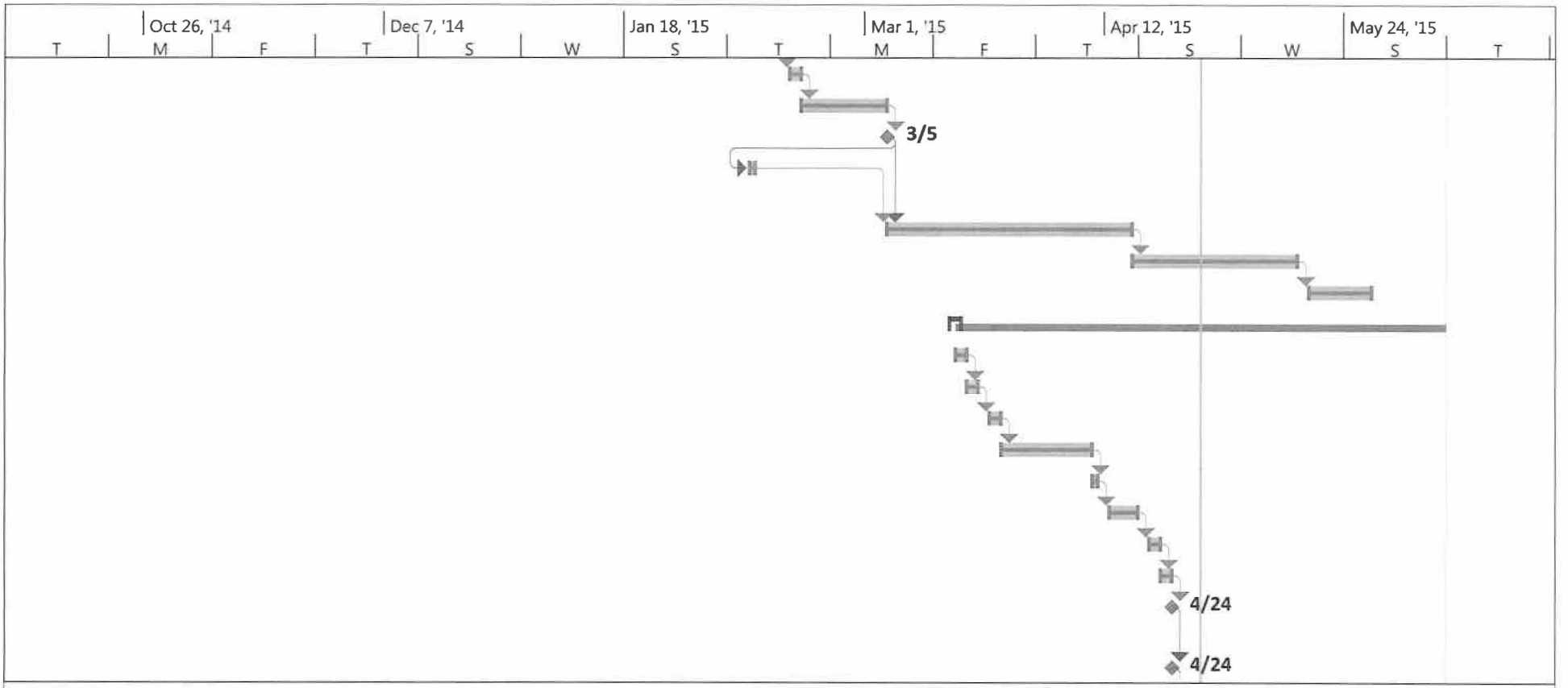

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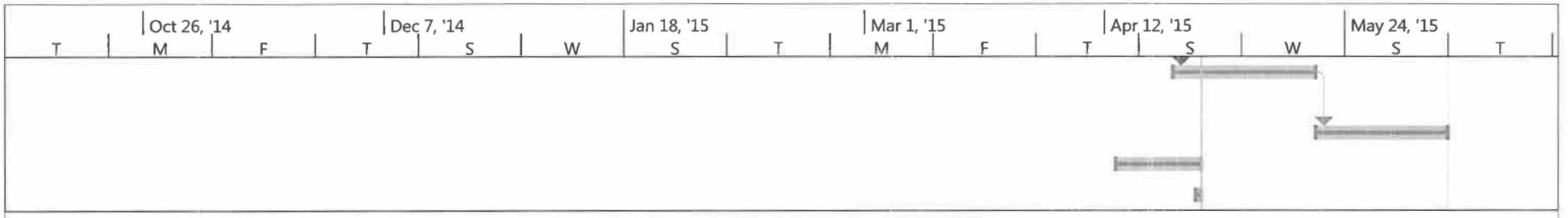

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Inactive Summary		Progress	
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Duration-only			

Stakeholder Register Template

FN: Stakeholder Register Template 090513	Identification Information					Assessment Information (Their project requirements and expec			
	Organization	Position/Title	Location	Role	Contact Information	Major requirements	Measures of Success	Expectations	Primary Concerns
Internal Stakeholders (internal to performing organization)									
Les Hardesty	COP	FLD Srv Super	KIC	Sponsor	659.7391	Working System	Tangeable	working product installed summer 2015	Too Robust too fast
Ray Chumley	COP	FLD Srv Super	KIC	Sponsor	659.7391	Working System	Tangeable	working product installed summer 2015	Too Robust too fast
Pat Holland	AES	FLD Srv Super	KIC	Sponsor	659.7439	Ease of Use	Operational	Meets ops & maint. Standards	Expensive to maintain
Charlie Stewart	AES	FLD Spt. Gen F	KIC	Team	659.777O	Ease of Use	Training and use	Meets ops & maint. Standards	Procedure issues
Terry Nunberg	AES	Hvy shop Gen F	KIC	Team	659.7972	Simple Maintenance	Low Maintenance	Low Maintenance	High Maint.
Steve Greer	AES	Oiler Frmn	KIC	Team	659.7179	Product avail.	Accessable	Access	not robust enough
Jamie Wajacha	AES	LD Shop Gen F	KIC	Team	659.7868	Training Req.	Simple Training	training & competance	training and competancy
Jerry Blackson	AES	LD Shop Gen F	KIC	Team	659.7868	Training Req.	Simple Training	training & competance	training and competancy
LuAnn Piccard	UAA	Advisor	UAA	advisor	email	prgm. Req	completes req.	Finalized	Fail
Roger Hull	UAA	Advisor	UAA	advisor	email	prgrm. Req	completes req.	Finalized	Fail
Kim Dae Seong	UAA	Advisor	UAA	advisor	email	prgrm. Req	completes req.	Finalized	Fail
625 Field Services	AES		Field		659.7439	Accessability	Accessable	Access	Difficul Access
COP Engineering	COP		KOC	resource	659.7748	Compliance	Meets need	Meets ops & maint. Standards	Does not meet requirements
COP Capital Projects	COP		KOC	resource	659.7268	Cost	Cost	cost	Too costly
627 Camp Maintenance	KOC		KOC	resource	659.7888	Simple Maintenance	Low Maintenance	Low Maintenance	Expensive to maintain
COP Environmental	COP		KIC	resource	659.7472	Compliance	In Compliance	Compliance	Does not meet requirements
626 Wells Support	AES		KIC	resource	659.7823	Accessability	Accessability	Access	Difficult access
External Stakeholders (external to performing organization)									
State of Alaska	Government			interest		compliance	compliance	compliance	Spills
3rd Party Contractors	Various			interest		accessability	accessable	access	Difficult access
EPA	Governemnt			interest		compliance	compliance	compliance	Spills
GKBU									

tations)	Classification (Their relationship to and ability to impact project)					Communication (How they like to be communicated with)				
Other helpful info	Classification (e.g. P/I, P/I, I/I, Salience, etc.)	Current Level of Support	Desired level of support	Key influencers /relationships	Other helpful info	Mode	Frequecncy	Level of detail	Format	Other helpful info
	D			Practicality		face to face	weekly	High	Status updates	
	D			Practicality		face to face	weekly	High	Status updates	
	D			Low Cost/Low Maint.		face to face	weekly	High	Status updates	
	B			Ease of use		face to face	weekly	High	Status updates	
	B			Low Maint.		face to face	weekly	High	Status updates	
	B			Ease of use		face to face	weekly	High	Status updates	
	B			Easy to Train		face to face	weekly	High	Status updates	
	B			Easy to Train		face to face	weekly	High	Status updates	
	D/B			Project Success		email/class	bi-weekly	High	Status updates	
	D/B			Project Success		email/class	bi-weekly	High	Status updates	
	D/B			Project Success		email/class	bi-weekly	High	Status updates	
	A			Information		FYI communi cations	as needed	Low	phone/infor mal	
	C			Information		email	as needed	Med	phone/infor mal	
	C			Information		email	as needed	Low	phone/infor mal	
	C			Low Maint.		email	as needed	Low	phone/infor mal	
	C			Information		email	as needed	Med	phone/infor mal	
	A			Monitor		FYI communi cations	as needed	Low	phone/infor mal	
	B			Monitor		Year end	yearly	med	yearly report	
	A			Monitor		FYI communi cations		Low	phone/infor mal	
	C			Monitor		Year end	yearly	med	yearly report	
	C - High P/Low int - keep satisfied									
	D - High P/High Int Mng. Close									
	B - Low P/High Int keep informed									
	A - Low P/Low Int Monitor									

Requirements Traceability Matrix

Requirement #	Source (Stakeholder Name or Group, Reference Document, etc.)	Stakeholder Register Reference	Requirement Description	Requirement Classification (business, functional, regulatory, etc.)	Project Objective Reference	Priority	WBS Work Package Reference	Acceptance Criteria	Validation method	Risk Register Reference	Key Dependencies, Impacts, Contraints	Owner
1	COP	5,6	DEF Distribution System	Functional	1	5	1.1	research, bids requirements	Final approval	5	Engineering	PM/ Sponsor
2	COP	5,6	Portable/Mobile	Functional	2	5	1.1.2	bids/proposals	vendor confirmation	5	Engineering/product availability	PM/ Vendor
3	COP	5,6	Not over-built	business	3	4	1.1	bids/proposal/research	research/product description	4	Engineering/product availability	PM/ Vendor
4	COP	5,6	Climate Control	Functional	4	5		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
5	COP	5,6	Blast proof	Functional	5	4		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
6	COP	5,6	Secondary Containment	Regulatory	6	5		bids/proposal	research/product description	7	Engineering/product availability	PM/ Vendor
7	COP	5,6	Shore Power hook up	Functional	7	5		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
8	AES 627 Camp Maintenance	19	Outside Lighting	Functional	8	4		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
9	AES 625 Field Services	16	Generator Built in	Functional	9	4		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
10	AES 625 Field Services	16	30 hours run time on Generator	Functional	10	3		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
11	AES 625 Field Services	16	Fork Pockets	Functional	11	3		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
12	AES 625 Field Services	16	Picking Eyes	Functional	12	3		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
13	AES 625 Field Support	8	Overflow Preventor	Functional/Regulatory	13	5		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
14	AES 625 Heavy Duty Shop	9	Stockable Maintenance Parts	Business	14	4		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
15	AES 625 Light Duty Shop	11,12	Training	Business	15	4		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
16	AES 626 Wells Support/AES 625 Field Support	16,21	Easily Accessible	business	16	4		bids/proposal	research/product description	5	Logistics/planning	Planner/PM

ID	Category	Risk Description	Probability (%)	Impact	Exposure	Mitigation	Risk Response and Description	Owner	Status/Frequency	Date Entered	Date to Review
1	Schedule	Communication between Hitch Changes	90%	14 days	High	PM Shall call in regularly with alternate while on R&R	Set up work email at PM's home	PM	4 days -9/17	9/19/2014	10/3/2014
2	Schedule	Information not relayed while PM is on R&R	75%	20 days	High	PM Shall call in regularly with alternate while on R&R	Additionally use of other forms of communication i.e. email	PM	2 days - 9/21	9/19/2014	10/3/2014
3	Schedule	Decision Makers not on site at the right time	50%	7 days	Med	PM Use of Outlook for all meetings and appointments	Obtain authorization to contact while they are conducting business off site	PM	n/a	9/19/2014	10/3/2014
4	Cost	Custom build is too expensive	25%	120 days	Low	Regular check ups with vendors on their proposals	Research shall include alternatives of products and vendors	PM	n/a	9/20/2014	10/4/2014
5	Function	Product can not meet all engineering requirements	66%	120 days	High	Research further for alternatives	Research shall include alternatives of products and vendors	PM	1 -DEF Trailer (Thundercreek)	9/21/2014	10/5/2014
6	Logistics	Product can not arrive on time	50%	6 months	Med	Adjust project to allow for this risk	Draft proposals for alternative site locations	PM	n/a	1/7/2015	10/6/2014
7	Schedule	Vendor does not respond	25%	2 Months	Low	Use alternative or back up vendor	Drop vendor and use alternate vendors already researched	PM	n/a	1/7/2015	1/7/2015
8	Cost	Vendor solution is too expensive	60%	1 month	High	Use alternative vendor	Drop vendor and use alternate vendors already researched	PM	n/a	1/7/2015	1/8/2015
9	Schedule	Vendor can not deliver on time	50%	3 months	Med	readjust schedule/use alternative vendor	Re-baseline the project with schedule adjusted/use alternative vendor	PM	n/a	1/8/2015	1/9/2015
10	Cost	Vendor will have to outsource engineering	60%	2 months	High	Readjust cost and re-baseline	Re-baseline project for cost and schedule or use alternative vendors	PM	n/a	1/9/2015	1/10/2015
11	Cost/Schedule	Vendor will have to re-design, re-work system	75%	6 months	High	Use alternative vendor/add change order	Re-baseline project for cost and schedule or use alternative vendors	PM	n/a	1/10/2015	1/11/2015
12	Schedule	Vendor will not work with our system of doing business	15%	1 months	Low	Search for alternative ways to pay vendor or other system to pay	Use alternative methods or sites for payment	Admin	n/a	1/11/2015	1/12/2015
13	Cost	Shipping costs are too expensive	35%	1 months	Low	Use our own shipping vendors	Receive shipping bids from vendors Conoco already works with	Sponsor	n/a	1/12/2015	1/13/2015
14	Requirements	Vendor does not fulfill requirements	40%	6 months	Med	Use alternative vendor/re-baseline project schedule	Drop vendor and use alternate vendors already researched	PM	n/a	1/13/2015	1/14/2015
15	Function	Vendor's solution is outside of scope	25%	1 month	Low	Use alternative vendor/re-baseline project schedule	Re-baseline project for cost and schedule or use alternative vendors	PM	n/a	1/14/2015	1/15/2015
16	Schedule	Vendor's solution will require change orders	50%	1month	Med	Re-baseline project	Re-baseline project for cost and schedule or use alternative vendors	Committee/ sponsors	n/a	1/15/2015	1/16/2015
17	Schedule	Project Sponsor and team change personnel	75%	3 months	High	Re-baseline project to bring new personnel up to speed	Re-baseline project for schedule	Committee/ sponsors	n/a	1/16/2015	1/17/2015
18	Requirements	Requirements change through the project	50%	1month	Med	Submit change orders and follow system	Use change order system and re-baseline if necessary	Committee/ sponsors	n/a	1/17/2015	1/18/2015

Key Term #	Key Term	Definition	Requirement Impact	Function
1	COP	**ConocoPhillips** - Oil and gas company	1 ~ 7	Business
2	COPA	**ConocoPhillipsAlaska**- Oil and Gas company North Slope	1~7	Business
3	ASRC	**Arctic Slope Regional Corporation** - Main Operations and Maintenance Company Contractor to handle O&M on the Kuparuk Field	8~16	Business
4	AES	**ASRC Energy Services** - ASRC Subsidiary to handle O&M operations on the North Slope of Alaska	8~16	Business
5	DEF	**Diesel Exhaust Fluid** - DEF is the reactant necessary for the functionality of the SCR system. It is a carefully blended aqueous urea solution of 32.5% high purity urea and 67.5% deionized water.	1~16	Product
6	SCR	**Selective Catalytic Reduction** - SCR is a technology that uses a urea based diesel exhaust fluid (DEF) and a catalytic converter to significantly reduce oxides of nitrogen (NOx) emissions. SCR is the leading technology being used to meet 2010 emission regulations	1~16	Function
7	API	**American Petroleum Institute** - API Certification is a voluntary program established by the American Petroleum Institute (API) which certifies and monitors that diesel exhaust fluid meets ISO specifications. The program was launched in March 2009. Cummins Filtration DEF currently meets ISO specification and is also API certified.	1~16	Business
8	IBC	**Intermediate Bulk Containers** - Intermediate Bulk Containers (IBC) are all containers larger than a 55 gallon (207L) drums, and smaller than a tanker	1~16	Function
9	Tote	**Stainless Steel Vessel for transporting and holding DEF** - The 275 gallon tote is disposable and primarily used for refilling of the larger plastic refillable tote. However, if customers do utilize the 275 gallon tote the transfer equipment must be DEF compatible and completely free of contaminants. Stainless steel and high density polyethylene plastic are DEF compatible materials.	2,3	Function
10	Micro Matic	**Valve System for Closed Tote Systems** - Micro Matic is recognized in the DEF marketplace as Closed System Solution providers for single use and multi-use container valve systems. Providing economical solutions for operations that require One Way, Returnable/Refillable and On-site Refilling, Micro Matic can assist in delivering consistent DEF purity, ensure packaging integrity and maximize operational efficiencies throughout the supply chain from fill to dispense.	2,3	Function
11	Closed Tote System	**Tote Dispensing System** - A third liquid-dispensing approach is the "closed" or sealed system, and this is a significantly safer approach than either the open or semi-closed methods. Closed systems rely on a pump to draw the media from the container and deliver it to the end process.	2,3, 13	Function
12	Mod.	**Module** - Structure designed to house a specific process or function.	1~7, 9,10~13	Function
13	Skid	**Skid** - Platform or base/foundation for the Module to sit on.	1~7, 9,10~14	Function
14	Picking Eyes	**Picking Eyes** - Fixture on the Module with an eyelet for feeding a shackle or other device through for the purposes of lifting the Module with a crane.	1~7, 9,10~15	Function
15	Fork Pockets	**Fork Pockets** - Built into the skid allows a forklift or loader to slide forks into the skid structure to lift the skid and module of the ground.	1~7, 9,10~16	Function
16	Tank Farm	**Tank Farm** - A collection of tanks above ground staged in one localized area	1~7, 9,10~17	Function
17				
18				
19				
20				
21				
22				

23				
24				

Research Evaluation Matrix

Item#	Issue/Concern/Requirement	Requirement	Stakeholder	Power	Risk ID #	Mitigation #	Risk Severity	Research Method	Client Satisfied? Y/N	Change Order Requested? Y/N
1	Mobility	2	COP	4	5	5	5	Vendor	Y	Y
2	Safety	15	AES	4	7	7	5	Osha	Y	N
3	Reliability	3	COP	4	5	5	4	Vendor	Y	N
4	Weight	2	AES	4	7	7	5	Vendor	Y	Y
5	User Friendly	16	AES	4	5	5	3	vendor	Y	Y
6	Interchangeable Totes	2	AES	4	5	5	5	Vendor	Y	N
7	Lighted	8	AES	4	7	7	5	Vendor	Y	N
8	Back up Generator	9	AES	4	5	5	3	Vendor	Y	N
9	Penel Hitch	2	AES	4	5	5	3	Vendor	Y	N
10	Power Station Vehicle Supply	7	AES	4	5	5	5	Vendor	Y	Y
11	Eye Wash Station	6	AES	4	7	7	5	Osha	Y	N
12	Fire Suppression System	6	AES	4	7	7	5	Osha	Y	N

Lessons Learned

Project	DEF Research and Recommendation Project	**Project #**	14-3.5
Project manager	M. McDonough	**Sponsor**	Hull/COP
Project artifacts	PMP	**Updated**	12/1/2014

ID	Category	Desc. Lessons Learned	Key Words
1	Schedule	With the rotational schedule in effect for all Project Team Members,Supplying adequate and updated information was a real challenge to ensure all Project Team Members were on the same page at all times.	Communication, buffer
2	Planning	Could have been more forceful and direct when asking for direction and solutions to new problems.	Opportunities, optimization
3	Planning	Pay close attention to corporate priorities and market movement and flex scope to match these changes to ensure a successful product	Scope, priorities
4	Planning	Create a communication platform to ensure management and PM's are synchronized when making decisions, bring communication platform to meetings	Decisions, phase gates
5	Schedule	When dealing with several different vendors, giving deadlines to questions and concerns would have been useful to prevent delays.	Buffer, lag time and constraints
6	Planning	When dealing with several different vendors, stating timeline goals and milestone goals for the project would have made communicating more effective in improving research and optimizing solution efforts.	Contract Management, risk/mitigation
7	Schedule	Knowing we are dealing with custom products, it would have been helpful to spec out one product and give those specs to the next vendor instead of trying to spec out each product simultaneously.	Environment, cost savings
8	Planning	Receive as many bids as possible and look for Vendors who havethe ability to be versatile and accept change orders and maintain the schedule would have benefitted the project from the start.	Bids, cost, risk mitigation
9			
10			
11			
12			
13			
14			
15			

Stake Holder Requirments Survey	Containment Importance Level (Environmental) 1-10	Equipment must be trailer	Equipment must be Stationary	Equipment must be both Stationary/Mobile	Weight of unit level of importance (1-10)	User Friendly (minimal training) 1-10
Les Hardesty (COP Supervisor Field Services)	8	No	Yes	Yes	6	7
Ray Chumley (COP Supervisor field Services)	9	No	Yes	Yes	7	7
Pat Holland (AES Field Services Superintendent)	5	Yes	No	Yes	9	9
Jerry Blackson (AES Master Mechanic Light Duty)	5	No	No	Yes	7	6
Terry Nunberg (AES Master Mechanic Heavy Duty)	5	Yes	No	Yes	6	6
Jim Anderson (AES Tank Planner/Coordinator)	10	No	No	Yes	5	7
Steve Greer (AES Oiler Forman)	7	No	Yes	Yes	9	9
Charles Stewar t (AES Field Support General Foreman)	9	No	No	Yes	9	10
Kurt Armstrong (AES Superintendent Field Services)	7	No	No	Yes	9	8
Dave Holland (AES Field Support General Foreman)	9	Yes	No	Yes	8	10
Jaime Wajchia (AES Master Mechanic Light Duty)	7	Yes	No	Yes	6	7
Kevin Green (AES Master Mechanic Heavy Duty)	7	No	Yes	Yes	6	7
Neal VanGorder (AES Safety Specialist 625)	8	No	No	Yes	7	8
Jon Spezialetti (AES Safety Specialist 625)	8	No	No	Yes	6	8
Dan Morton (AES Industrial Hygienist)	7	No	No	Yes	7	10
Dion Sumner (AES Roads & Pads General Foreman)	6	No	No	Yes	6	8
Andy Lachinsky (AES Roads & Pads General Foreman)	6	No	Yes	Yes	6	7
Darren Rudolph (AES Wells Support General Foreman)	6	No	No	Yes	5	9
	>5 =0, 5-6=1,<7=2				>5=0, 5-6=1, <7=2	>5=0, 5-6=1, <7=2
totals		14 no	14 no	19 yes		

Safety Importance (1-10)	Storage/Handling Requirement level of importance (1-10)	Dispensing Flow Rate importance Low - High (1-10)	Scoring	Results
9	8	9	2+2+1+1+2+2+2+2+2+2	18
9	8	9	2+1+2+1+2+2+2+2+2+1	17
9	8	7	1+2+2+1+2+2+1+2+2+2	17
8	8	7	1+1+2+2+2+1+2+1+2+2	16
9	7	7	1+1+1+2+1+2+2+2+2+2	16
8	8	6	0+1+2+1+2+2+2+2+2+1	15
9	9	9	1+1+2+1+2+2+1+2+1+2	15
8	8	10	0+2+1+2+1+2+1+2+2+2	15
9	9	7	0+1+2+2+1+2+2+2+1+2	15
10	8	10	2+1+2+2+1+1+1+1+2+1	14
9	9	7	0+0+2+2+1+2+2+2+2+1	14
8	8	6	2+2+1+2+1+1+2+1+1+1	14
10	8	6	1+2+1+1+1+2+2+2+1+1	14
10	7	6	1+0+1+1+2+1+2+2+1+2	13
10	8	7	1+0+1+2+2+2+2+1+1+1	13
8	8	7	1+1+2+1+2+1+1+2+0+1	12
9	9	8	1+1+1+2+1+1+1+2+0+2	12
8	8	8	0+1+1+2+1+1+2+1+0+1	10
>5=0, 5-6=1, <7=2	>5=0, 5-6=1, <7=2	>5=0, 5-6=1, <7=2		

Risk Mitigation Implemented and Executed	Date First Occurred	Date Last Occurred	Frequency	Probability (%)	Impact	Exposure
Communication between Hitch Changes	10/14/2014	2/6/2015	8.00	90%	14 days	High
Information not relayed while PM is on R&R	10/26/2014	1/16/2015	2.00	75%	20 days	High
Decision Makers not on site at the right time	1/25/2015	2/17/2015	2	50%	7 days	Med
Stakeholder moved to new position	1/30/2015	1/30/2015	1	25%	120 days	Low
Product can not meet all engineering requirements	11/14/2014	2/12/2015	4	66%	120 days	High

Mitigation	Risk Response and Description	Owner	Status/Frequency	Risk Mitigation Implemented?	Impact To Project	Mitigation Successful?
PM Shall call in regularly with alternate while on R&R	Set up work email at PM's home	PM	4 days -9/17	yes	16 days	yes
PM Shall call in regularly with alternate while on R&R	Additionally use of other forms of communication i.e. email	PM	2 days - 9/21	yes	6 days	yes
PM Use of Outlook for all meetings and appointments	Obtain authorization to contact while they are conducting business off site	PM	n/a	yes	4 days	yes
PM shall schedule all necessary meetings immediately to inform team and new supervisor of the status of the project	Schedule additional meeting immediately to inform new supervisor	PM	n/a	yes	14 days	yes
Research further for alternatives	Research shall include alternatives of products and vendors	PM	1 -DEF Trailer (Thundercreek)	yes	12 days	yes

Change Log				Change Log							
Project	DEF Research and Recommendation Project	**Project #**	1.5								
Project manager	M. McDonough	**Sponsor**	Hull/COP								
Project artifacts	PMP	**Updated**	2/25/2015								

ID	Category	Change Description	Priority	Evaluator	Status	Date of Decision	Included in Revison #	Date Entered	Date Assigned		
1	Schedule	Additional and supplemental units were added to expand the scope of the project from a long term solution to a short term	Med	PM, Committee	Complete	10/24/2014	1.5	10/24/2014	10/24/2014		
2	Procurement	Vendor was dropped from initial proposal for failing to meet engineering requirements. New Vendor was selected.	Low	PM, Committee	Complete	11/10/2014	1.5	11/1/2014	11/10/2014		
3	Personnel	Sponsor change. Ray Chumley accepted new position in Kenai, New Sponsor as Les Hardesty's alternate will be	High	PM, Committee	Complete	1/21/2015	3	1/14/2015	1/21/2015		
4	Personnel	Additional meetings to bring new Sponsor up to speed on the project will be scheduled and added to the project.	High	PM, Committee	Complete	1/21/2015	3	1/21/2015	1/27/2015		

ConocoPhillips Alaska
DEF Distribution System Procurement Project

ConocoPhillips

Alaska's Oil & Gas Company

ONE CREW · ONE JOURNEY

Project Management Plan
April 28, 2015

Project Management Department, University of Alaska Anchorage

Contents

Abstract

ConocoPhillips Alaska has an oil production field located on Alaska's North Slope. As part of its operations, it employs the use of a heavy equipment fleet. As EPA requirements have changed in the emissions of heavy equipment, these pieces of equipment are required to utilize a new diesel exhaust fluid system. The North Slope of Alaska is in an extreme arctic environment. For it to be effective in reducing exhaust emissions, it must be stored within a temperature range of approximately 33 degrees F to 77 degrees F.

ConocoPhillips needs a system for storing and distributing DEF. There is no such system currently in operation today on the Kuparuk field. This project will procure a DEF Distribution System custom built and designed for the climate and conditions required on the Kuparuk Oil Field. Procurement of the system will be based on the research and recommendations of the DEF Distribution System Research and Recommendation Project.

ConocoPhillips has requested a self-sustaining, robust, dispensing system that can be, if needed, relocated to various parts of the field depending on the operations of heavy equipment. The system needs to be all inclusive, portable, and meet the product requirements for storage and the system requirements for dispensing.

Sponsor Letter of Approval

ConocoPhillips DEF Distribution System

Memo

To: University of Alaska Anchorage

From: Michael McDonough

Date: September 12, 2014

Re: Client/Sponsor letter of support for Michael McDonough to lead the DEF Distribution System Project at Kuparuk

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We have selected Michael McDonough to be the project manager to establish a DEF Distribution System at Kuparuk by September 1, 2015. This project is an important and vital project for us because it will standardize our DEF Distribution System, provide operations management, align the project with our corporate strategic goals and help our company comply with EPA regulations while building an operations and maintenance plan for DEF distribution and dispensing.

As project manager, Michael McDonough is responsible for working with the team to develop a project plan that describes the objectives, deliverables, and implementation plan for the project. Mr. McDonough will work with our functional managers to assign the appropriate resources to the project.

Mr. McDonough will execute the project plan, monitor progress and performance, and take corrective action if necessary. Mr. McDonough will communicate assignments to functional managers and the members of the project team. For the duration of the project, Mr. McDonough will prepare and present status reports every week while on shift to the ConocoPhillips and AES Superintendents and management team.

I have the utmost confidence in Mr. McDonough and ask that you support her in achieving the objectives of this project. If you have any questions about his authority or responsibilities, please contact me.

Ray Chumley
Les Hardesty
Office: 907.659.7931
Cell: 907.943.1741
Email: n1805@conocophillips.com

Introduction – Project Charter

ConocoPhillips DEF Distribution System
Memo
To: ConocoPhillips
From: Michael McDonough
Date: January 05, 2015
Re: Project Charter to Procure a DEF Distribution System on the Greater Kuparuk Business Unit

Executive Summary

This project is a procurement project based on research from a prior project conducted earlier in the latter half of 2014. The procurement aspect of this project is geared towards a new Diesel Exhaust Fluid Distribution System for the Greater Kuparuk Business Unit. The sponsor, ConocoPhillips Alaska has purchased new tier IV heavy equipment that according to The Environmental Protection Agency requires these new vehicle to meet an emission standard lower than the previous models or tier III. Most all manufacturers went to a system which injects Diesel Exhaust Fluid into the emission system. This additive greatly reduces carbon emissions. The Kuparuk oil field located on the shoreline of Alaska's North Slope is a remote location. Future projects will revolve around staging heavy equipment in remote sites all over the Kuparuk field. This will require a distribution system as it is impractical to transport the heavy equipment to a DEF station. DEF is a sensitive material requiring that it be continuously held within a small range of temperature per product specification. This temperature range is between 32 degrees F and 77 degrees F or it runs a high risk of becoming ineffective to the emission system. The only current method of delivering DEF is in 2.5 gallon jugs. As the need for DEF increases, these jugs will be ineffective for distributing the product.

Project Purpose/Justification

There are several different system products for achieving the project objective, however, none of these systems are engineered and designed to meet the harsh climate challenges found on the North Slope of Alaska where temperatures can occasionally drop in excess of 60 degrees below zero. The harsh winter climate of the North Slope makes distribution of DEF very sensitive in maintaining the integrity of the product.

This project's aim will determine the product specifications of not only the product (DEF) but also the system of distribution. The project will determine all stakeholder requirements and needs and provide the research and mitigation tools to meet specified needs and mitigate potential risks and constraints. The research will be conducted on several platforms from documentation to vendor expertise. Upon conducting the research and providing information to stakeholders, the conclusion of the research will produce a recommendation to the client for which vendor and product will meet all stakeholder requirements. This recommendation based on research and feedback from stakeholders will be the basis for the client to draw conclusions and make a procurement decision.

Business Need/Case

To refuel heavy equipment staged at various remote sites for future projects, the DEF product must find its way to the heavy equipment staged at remote sites. There are many

future projects for operations and maintenance as well as exploration planned in the coming years. New equipment with DEF as part of the exhaust system has already been purchased and is anticipated to arrive this winter. Currently, there is not a system at Kuparuk that can deliver DEF to these new vehicles.

Business Objective

The objective is to research and contact vendors that can meet the unique challenges of the North Slope climate. There are several methods currently being used for distributing DEF but the objective is to find a vendor who can meet our requirements. This will include research in ensuring that our requirements are within legal laws and limits and within the safety culture of the field and identifying various requirements for performance and maintenance needs.
Complete the research and recommendation project by December 2014 in order for the sponsor to make a decision for procurement.
Use the research and recommendation project as a guideline and reference during the next project of procurement of a DEF system scheduled for January 2015.
Complete matrices in document control to ensure there is no miscommunication between our project management team and the vendor.
Trace all requirements of the system and ensure they are meeting the sponsor's needs.

Project Description

The Diesel Exhaust Fluid Distribution System will provide research on three specific methods for distributing the DEF product. Through the research, vendors will be contacted and Requests for Proposals will be asked to be provided from the vendors. Engineering controls, safety measures, environmental and permitting requirements will also be researched to ensure the product meets all requirements.

Project Objectives and Success Criteria

Objectives for the success of this project will include the following:

- Sponsor acceptance by September 19th 2014.
- Selection of vendors and system products by October 3rd 2014.
- Research completed on all traceable requirements by November 17th 2014.
- Final decisions on product by December 1, 2015.
- Handoff to procurement by December 10, 2014.

Requirements

- The requirements for this project to succeed are as follows:
- The research must provide enough information for the sponsor to make a decision on which system to buy.
- The research must be presented in terms the sponsor and stakeholders understand.
- The recommendation must be secured by December 1, 2015.
- All deliverables must be turned in with the class syllabus requirements.
- Any additional requirements may be added with sponsor approval as the project progresses.

Constraints

- The system, whichever is selected must meet all engineering , legal and environmental requirements.

- The system, whichever selected, must be able to keep the product in a limited temperature range.
- The System, whichever selected, must be mobile and robust enough to be self-sufficient and self-contained.

Assumptions

The sponsor is in full support of this project's objectives.
Stakeholders have an equal and mutual interest in seeing the project through to handoff.
Vendors will be able to provide a proposal within the timeline of these projects objectives.
There is a product that can meet our needs or that one could be engineered to meet the project's needs.
Vendors will provide supplemental expert and proprietary information for the purposes of the bidding process.

Project Management

Michael McDonough, the assigned Project Manager has the overall authority and responsibility for managing and executing the project. This includes any all work related tasks and any project related research. The project committee, consisting of several department and functional managers and UAA MSPM group will assist the Project Manager with various tasks as needed. The Project Manager will work closely with the sponsor and stakeholders to ensure requirements are being met and the project stays within scope. Project and management plans will be reviewed at regularly held meetings and approved by the project sponsor and committee. Funding will be decided by the project sponsor based on the validity of the research conducted in the project. The Project manager has the responsibility of driving the project by managing requirements, communications and progress/performance targets. Delegation of tasks and various approval authorities will be written between the project manager and the sponsor.

Project Scope

The DEF Distribution System Research and Recommendation project will provide research, product knowledge, vendor bids, engineering control information, operation and maintenance procedures and recommendation of which vendor and product(s) to purchase based on the requirements of the project. The research will include product availability, pros and cons of the product, engineering controls, EPA and state regulations research, future implications and projections of the Diesel Exhaust Fluid (DEF) System, current usage of DEF, projected usage of DEF, risk management and mitigation, field logistical requirements, blast zone regulations and procedures.

Once the DEF Distribution System Research and Recommendation project has been completed and accepted, a secondary document and project management plan will be implemented to purchase, engineer, verify, transport and implement the system on the Greater Kuparuk Business Unit North Slope Oil Field. As a secondary project, the implementation of the DEF Distribution System Research and Recommendation project will be crucial in securing the safety of future project success.

Research will be conducted online, brochures and with direct contact with vendors by phone, email, fax, and face to face meetings all over the United States. Research will also be conducted with local experts on the Kuparuk Field in engineering, maintenance, environmental, and safety through face to face meetings, conference calls, and emails. Meeting minutes will be taken for face to face meetings, meeting agendas and a record of emails will be collected to trace the information to the requirements matrix.

The project(s) described in this document are not to exceed 8 months with the final turnover of deliverables to operations April 25th 2015. Assumptions for this project are that necessary support from the sponsor and committee will be sufficient to see the project completed. Necessity of the requirements of the system will ensure the projects' success and resolve of the sponsor due to the previous purchase of heavy equipment requiring the product and requiring the product move to the equipment staged around the field.

Product Scope Statement

The DEF Distribution System Research and Recommendation project will provide research into available products, EPA standards, Alaska state regulations, engineering specifications, operation and maintenance requirements, blast zone identification and requirements, bids, product description, and product handling research. The final document will provide sufficient data for the sponsor to make a decision on which product will fill the requirements best. The benefits of the product and its system accompanied by Standard Operating Procedures will provide the best insight for the sponsor to make the decision to procure.

Final Research and Recommendation document to include:

- Abstract
- Description of the issue
- Description of the research
- Description of project participants
- Description of project support
- Description of methods
- Description of organization of materials
- Description of results
- Conclusion and recommendation
- Appendices
- Meeting minutes
- Email chains
- Bids
- Engineering controls
- Schematics
- References
- Historical data

Results from the research and recommendation project will kick start a new procurement project. A Project Management Plan for procurement will derive from the research and recommend project. Request for Quote (RFQ) and Authorization for Expenditures (AFE) will be the driver for execution of the Procurement Plan put in place next semester.

Project Scope Management Plan

Scope management for the Project will be the responsibility of the Project Manager and Project Sponsor. The scope for this project is defined by the Scope Statement, Work Breakdown Structure (WBS) and WBS Dictionary. The Project Manager, Sponsor, and management team will establish and approve documentation for measuring project scope which includes deliverable quality checklists and work performance measurements. Proposed scope changes may be initiated by the Project Manager, Project Sponsor or any member of the team.

SCOPE VERIFICATION PLAN

The scope of the project will be verified with agreement by the team and sponsor on the deliverables, work breakdown and schedule of work. The scope of the project will continually be compared and managed to the baseline for variances from our approved business case. Changes will be monitored through the following actions:

- Interactions with team members – weekly reports, conversations, etc.
- Confirmation that deliverables are a priority and on schedule to complete
- Periodic quality inspections
- Monitoring purchase orders
- Field visits

Quality Management Plan

All members of the project team will play a role in quality management. It is imperative that the team ensures that work is completed at an adequate level of quality from individual work packages to the final project deliverable.

Risk Management Plan

The approach for managing risks for the ConocoPhillips Urea Distribution System includes a methodical process by which the project team identifies, scores, and ranks the various risks. Every effort will be made to proactively identify risks ahead of time in order to implement a mitigation strategy from the project's onset. The most likely and highest impact risks will be added to the project schedule to ensure that the assigned risk managers take the necessary steps to implement the mitigation response at the appropriate time during the schedule. Risk managers will provide status updates on their assigned risks in the weekly project team meetings, but only when the meetings include their risk's planned timeframe.

Upon the completion of the project, during the closing process, the project manager will analyze each risk as well as the risk management process. Based on this analysis, the project manager will identify any improvements that can be made to the risk management process for future projects. These improvements will be captured as part of the lessons learned knowledge base.

Risk Register/Assessment

ID	Category	Risk Description	Probability (%)	Impact	Exposure	Mitigation	Risk Response and Description
1	Schedule	Communication between Hitch Changes	90%	14 days	High	PM Shall call in regularly with alternate while on R&R	Set up work email at PM's home
2	Schedule	Information not relayed while PM is on R&R	75%	20 days	High	PM Shall call in regularly with alternate while on R&R	Additionally use of other forms of communication i.e. email
3	Schedule	Decision Makers not on site at the right time	50%	7 days	Med	PM Use of Outlook for all meetings and appointments	Obtain authorization to contact while they are conducting business off site
4	Cost	Custom build is too expensive	25%	120 days	Low	Regular check ups with vendors on their proposals	Research shall include alternatives of products and vendors
5	Function	Product can not meet all engineering requirements	66%	120 days	High	Research further for alternatives	Research shall include alternatives of products and vendors
6	Logistics	Product can not arrive on time	50%	6 months	Med	Adjust project to allow for this risk	Draft proposals for alternative site locations
7	Regulation	Blast zone issues on placement	50%	6 months	Med	Re-engineer product - add into proposal	Draft proposals for alternative site locations

Project Management Approach

The Project Manager, Mr. McDonough, has the overall authority and responsibility for recommending, managing and executing this project according to this Project Plan and its Subsidiary Management Plans. The project manager will work with all resources to perform project planning. All project and subsidiary management plans will be reviewed and approved by the project sponsor: ConocoPhillips Superintendents Field Services. All funding decisions will also be made by the project sponsor. Any delegation of approval authority to the project manager should be done in writing and be signed by both the project sponsor and project manager.

The project team will be described in a matrix, and team members from each organization will continue to report to their organizational management throughout the duration of the project. The project manager is responsible for communicating with organizational managers on the progress and performance of each project resource.

Project CSF and KPI

- Customer Satisfaction Factors
- Design the DEF Distribution System to fit with the company culture and needs to comply with the growing demand of urea and conduct the business in an environmentally prudent manner.
- Include internal input from functional managers and project sponsors to ensure management support and cultural buy in to a new Urea Distribution System
- Provide plan for new Urea Distribution System that covers developing standard Methods and Procedures as well as Management, and Maintenance and Support to ensure long-term success that can change and evolve with Best Practices.
- Provide stakeholder management to a level that keeps necessary parties involved, and aware with several opportunities for input as the project progresses

Key Performance Indicators

Stay within 10% Cost
Stay within 10% of Schedule

Schedule Management Plan

Project schedules for the Project will be created using MS Project 20010 starting with the deliverables identified in the project's Work Breakdown Structure (WBS). Activity definition will identify the specific work packages which must be performed to complete each deliverable. Activity sequencing will be used to determine the order of work packages and assign relationships between project activities. Activity duration estimating will be used to calculate the number of work periods required to complete work packages. Resource estimating will be used to assign resources to work packages in order to complete schedule development.

Once a preliminary schedule has been developed, it will be reviewed by the project team and any resources tentatively assigned to project tasks. The project team and resources must agree to the proposed work package assignments, durations, and schedule. Once this is achieved the project sponsor will review and approve the schedule and it will then be base lined.

Change Management Plan

Any team member or stakeholder may submit a change request for the Project. The Project Sponsor will approve any changes to project scope, cost, or schedule must meet his approval. All change requests will be logged in the change control register by the Project Manager and tracked through to completion whether approved or not.

Communications Management Plan

The Project Manager will take the lead role in ensuring effective communications on this project. The communications requirements are documented in the Communications Matrix. The Communications Matrix will be used as the guide for what information to communicate, who is to do the communicating, when to communicate it, and to whom to communicate.

Stakeholders will be categorized based on their organization, department or contribution type. Stakeholders will be organized and then they will be positioned in a power/interest matrix to represent the potential impact each stakeholder may have on the project. Based on the placement a stakeholder analysis matrix will be complete which illustrates the concerns, level of involvement, and management strategy for each stakeholder.

Stakeholders will be categorized based on their organization, department or contribution type. Once all stakeholders have been categorized, they will be positioned in a power/interest matrix to visually display the potential impact each stakeholder may have on the project. Feedback from the stakeholders will contribute to the determination to be made to involve key stakeholders on committees, gate reviews, milestones reviews or other project meetings. This feedback and communication management strategy will be reflected in the Communication Management Plan.

This will benefit the project by minimizing the probability of competing objectives between stakeholders while capitalizing on the resource knowledge available to complete the project. Some stakeholders may have conflicting interests which may adversely affect the project efficiency. By initiating early and frequent communication and stakeholder management, effective management of any conflicting interests can be accomplished without negative impact on project objectives.

Task Management Plan

The Project Manager will assign tasks to individuals described as resources. Many of these assignments will overlap ensuring the management team works in a synchronized manner.

Cost Management Plan

The Project Manager will be responsible for managing and reporting on the project's cost throughout the duration of the project. The Project Manager will present and review the project's cost performance during the monthly project status meeting. Using earned value calculations, the Project Manager is responsible for accounting for cost deviations and presenting the Project Sponsor with options for getting the project back on budget. All budget authority and decisions, to include budget changes, reside with the Project Sponsor.

Procurement Management Plan

The Project Manager will provide recommendations for all procurement activities under this project. Any procurement actions must be approved by the Project Sponsor.

Contract type – TBD

Make / Buy decision – Urea Distribution System equipment and processes will be purchased. In addition, the cost will be less overall to customize the equipment and processes than to buy existing equipment or models. It is generally agreed it is also important to have the appearance of industry standard cutting edge material.

Vendor Selection process – 3 vendors will be considered for equipment and customizing. The following weighted criteria were used to select equipment:

Proposal Evaluation		Vendors	Vendor 2	Vendor 3	UREA DISTRIBUTION SYSTEM
Criteria	Weight	Score 1-5 with 5 as Best			
Prior Work Experience	25%		0	0	0
Past Performance	50%		0	0	0
Work Plan	5%		0	0	0
Price	20%		0	0	0
Total Score			0	0	0

Baseline Cost Assessment

The Baseline Cost assessments will be discussed at management meetings and regular updates will be provided through measurement of key performance indicators. Status update reports will be issued at the meetings and the key performance indicators will be outlined for management and stakeholders.

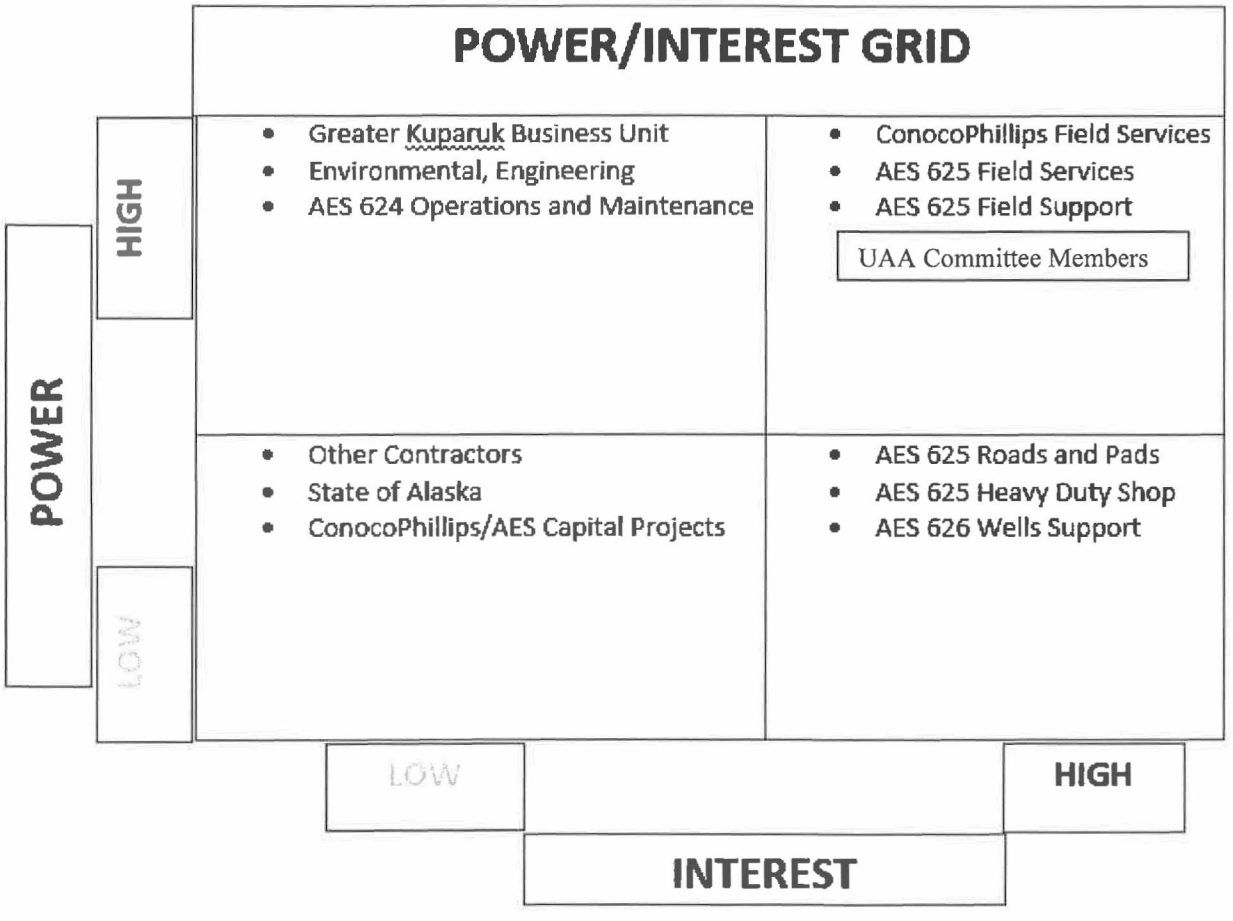
Stakeholders

- State of Alaska
- ConocoPhillips (Greater Kuparuk Business Unit) Engineering, Environmental, Operations, and Maintenance
- ConocoPhillips Field Services
- ASRC Energy Services (AES) 625 Field Services
- AES Field Support 625 Support Services
- AES Field Support 625 Heavy Duty Shop
- AES Production Services 626 Wells Support
- AES Field Support 625 Roads and Pads
- AES Maintenance Services 624 Operations and Maintenance
- AES Maintenance Services 624 Capital Projects
- UAA Project Committee Members

Enterprise Environmental Factors

Engineering poses to be the main issue in accomplishing delivering the requirements for this specific project. Several vendors have been contacted and given the projects' unique issues. At this time, there are no products on the market that meet the requirements of this project. Every vendor that has been contacted are having to engineer their product to our requirements in dealing with the distribution system specifically at temperatures below -40 degrees F for sustained periods of time. There are some viable options ranging from all inclusive and contained APU units to utilizing systems with compressed natural gas. Every vendor spoken to is willing to manufacture a unique product tailored to our requirements. Additionally, the bidding process will require the project obtain a minimum of three bids

per unit once it has been agreed on product selection. This poses a challenge in of itself in regards to the product requirements being so unique and specific to Kuparuk's conditions.



Stakeholder Register
(See also in appendices)

Identification Information					Assessment Information (Their project requirements and expectations)					Classification (Their relationship to and ability to impact project)					Commu
Organization	Position/Title	Location	Role	Contact Information	Major requirements	Measures of Success	Expectations	Primary Concerns	Other helpful	Classification (e.g. P/I, P/I, I/I,	Current Level of	Desired level of	Key influencers	Other helpful	
COP	FLD Srv Super	KIC	Sponsor	659.7391	Working System	Tangeable	working product installed summer 2015	Too Robust too fast		D			Practicality		face to face
COP	FLD Srv Super	KIC	Sponsor	659.7391	Working System	Tangeable	working product installed summer 2015	Too Robust too fast		D			Practicality		face to face
AES	FLD Srv Super	KIC	Sponsor	659.7439	Ease of Use	Operational	Meets ops & maint. Standards	Expensive to maintain		D			Low Cost/Low Maint.		face to face
AES	FLD Spt Gen F	KIC	Team	659.777	Ease of Use	Training and use	Meets ops & maint. Standards	Procedure issues		B			Ease of use		face to face
AES	Hvy shop Gen F	KIC	Team	659.7972	Simple Maintenance	Low Maintenance	Low Maintenance	High Maint.		B			Low Maint.		face to face
AES	Oiler Frmn	KIC	Team	659.7179	Product avail.	Accessable	Access	not robust enough		B			Ease of use		face to face
AES	LD Shop Gen F	KIC	Team	659.7868	Training Req.	Simple Training	training & competance	training and competanc		B			Easy to Train		face to face
AES	LD Shop Gen F	KIC	Team	6597868	Training Req.	Simple Training	training & competance	training and competanc		B			Easy to Train		face to face
UAA	Advisor	UAA	advisor	email	prgm. Req	completes req.	Finalized	Fail		D/B			Project Success		email/c lass
UAA	Advisor	UAA	advisor	email	prgrm. Req	completes req.	Finalized	Fail		D/B			Project Success		email/c lass
UAA	Advisor	UAA	advisor	email	prgrm. Req	completes req.	Finalized	Fail		D/B			Project Success		email/c lass
AES		Field		659.7439	Accessability	Accessable	Access	Difficul Access		A			Information		FYI commu nication
COP		KOC	resource	659.7748	Compliance	Meets need	Meets ops & maint. Standards	Does not meet requireme nts		C			Information		email
COP		KOC	resource	659.7268	Cost	Cost	cost	Too costly		C			information		email
KOC		KOC	resource	659.7888	Simple Maintenance	Low Maintenance	Low Maintenance	Expensive to		C			Low Maint.		
COP		KIC	resource	659.7472	Compliance	In Compliance	Compliance	Does not		C			information		email

Stakeholder Management Plan

Sensitivity Analysis

As part of the final Integrated Process Team (IPT) gateway review a sensitivity analysis will be conducted to review the following four questions. Through multiple meetings and status updates, it has been determined that all questions and requests of the current project will be adequately met to all standards required of the initial project scope. However, one amendment has been made to accommodate all necessary improvements of the project. The project will incorporate a new modified baseline cost reflecting an increase to combat potential risks as described in the following:

Is all information included for a scope, schedule and budget analysis?

Can you reduce overall project budget without affecting completion date?

Determine least impact on scope and quality to reduce project duration by one month without affecting risk level of project.

Determine least expensive way to reduce project by one month with least overall impact to risk.

Summary Points:
1A) Stakeholder meetings occur weekly with necessary status updates on performance, progression and controls.

2A) Stakeholder meetings will permit suggested changes to be submitted on change request forms that will be reviewed and implemented based on committee approval and fit with current scope deliverables.

3A) The DEF DISTRIBUTION SYSTEM Research and Recommendation project will proceed unhindered from external factors and continue to its completion with the full support, determination and expectation from ConocoPhillips as to see the success of this project.

4A) The project will continue through to completion with little to no verification that it will inherently support an initial return on investment and additionally continue without knowledge of a Net Present Value as this project is not meant to serve as a profit base for ConocoPhillips.

Staffing Management Plan

The Project will consist of a matrix structure with support from a consulting firm, various internal organizations and two staff positions hired exclusively for UREA DISTRIBUTION SYSTEM implementation. Staffing requirements for the Project include the following:

- 2 Functional Managers
- 2 AES Superintendents
- PM Lead
- 2 Project Sponsors

Project Manager (1 position) – responsible for project management. The Project Manager is responsible for planning, creating, and/or managing all work activities, variances, tracking, reporting, communication, performance evaluations, staffing, and internal coordination with functional managers.

Functional managers - responsible for decision on equipment and process documents. Oversight of all Urea Distribution System implementation to ensure functionality is compliant with quality standards and culture.

Milestone List

Major Milestones are listed in the following chart for the DEF Dispensing System Research and Recommendation project. The chart includes major Milestones that pertain to the course and to the project. The milestones are also reflected in the project schedule and WBS. Scheduling delays will result in communication with the project committee and the project sponsor as pertained in the stakeholder management matrix and in accordance with the communication management plan. Mitigations in accordance with the risk register will be applied. Change requests at this time can be communicated and will be received by the project manager to decide which avenue to take.

Milestone Schedule - List Project Milestone	Target Date
Project Initiation	9/1/14
Research Phase	9/4/14
Planned Budget Review	10/1/14
First Go/No-Go Decision	10/24/14
Final Project Decisions	11/17/14
Second Go/No-Go Decision	11/21/14
Hand off to Procurement	12/1/14
Final Deliverables Due	12/10/14

ConocoPhillips Alaska
DEF Distribution System
Research and Recommendation
Project

ConocoPhillips

Alaska's Oil & Gas Company

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Research Management Plan

August 19, 2014
Research Management

Project Management Department, University of Alaska Anchorage

Introduction

The Research Plan for the DEF Distribution System Research and Recommendation project will be the key element for determining the success of this project. Through research, the PM will be able to make a recommendation to the sponsor of which products are available to meet the requirements of the DEF Distribution System. DEF is a new product since 2010 for tier 4 engines found in diesel equipment and trucks. There is not a system such as this in place at Kuparuk or on the North Slope of Alaska. The research will have to include several different methods to find the product or products that will meet our needs. This research plan will be added to the Project plan for the DEF Distribution Research and Recommendation plan as well as any plan that derives from it.

Executive Summary

Currently, The Greater Kuparuk Business Unit (GKBU) does not have a system for distributing DEF throughout the field. DEF freezes at around 32 degrees F and turns to a gel unfit for consumption at 12 degrees F. This poses a unique challenge to the GKBU as temperatures average much of the year below 0 degrees F. This project will implement a system that can store, distribute, and maintain an operation that meets the equipment needs at the GKBU.

In an effort to act in accordance with environmental control systems now being implemented on heavy diesel equipment, this project displays strategies to procure, distribute, maintain and control urea based products on heavy equipment at Kuparuk. New equipment built after 2010 comes equipped with Selective Catalytic Reduction (SCR) technology based on urea diesel exhaust fluid and a catalytic converter to significantly reduce oxides of nitrogen (NOx). SCR is the leading technology being used to meet 2010 emission regulations.

Diesel Exhaust Fluid (DEF) is the reactant necessary for the functionality of the SCR system. It is composed of 32.5% high purity urea and 67.5% deionized water. Urea is a compound of nitrogen that turns to ammonia when heated. DEF consumption will be approximately 2% of the diesel fuel consumed.

This research project will be designed to explore the various products available on the market and to communicate with various vendors regarding if they can manufacture a product for our specific needs on the North Slope. Tier 4 Heavy equipment has been ordered and is due to start arriving October 2014. These tier 4 pieces of equipment require DEF, so the necessity for finding a product is essential to future operations at Kuparuk. The sponsors will review the research and recommendation and then move on to a procurement project of the equipment January 2015.

Business Need

ConocoPhillips needs a DEF distribution system that is portable or mobile. This includes trailers and trucks. It can also include modules on skids that can be transported on flatbed trucks. As jobs arise and are located in remote sections of the field, the need for mobile equipment refueling and distributing is needed. This comes with a unique challenge as regular and existing DEF Distribution systems in production are not equipped to handle the harsh climate in which the Kuparuk field is located. DEF is a sensitive substance that must be controlled with temperature. Too warm and DEF degrades out of compliance and manufacturing specs and too cold DEF is not able to be dispensed and also suffers from degradation.

Another unique challenge is that in the coming years, DEF may be phased out as alternative methods of producing the EPA engine requirements may be put into production. There are several universities and a few manufacturers working on this. Designing and building a system that could be potentially phased out over the next five to ten years poses a potential problem in that the system chosen must not be too robust. The system must be able to be adaptive and added on to overtime as the increased need for DEF rises on the field when more tier 4 equipment is added. However, the tier 4 equipment already purchased has an expected life of 10 years on the field; therefore the need for a dispensing system is still pertinent to the operations on the Kuparuk field.

To meet this challenge, this project will examine the current methods already in existence and as manufacturers of these systems to modify and re-engineer their systems to meet our needs. Finding vendors that are both willing and able to custom design and build their products with our requirements and specifications will deliver the business need to the client. The results of this project will inform the client/sponsor to make a business decision that is beneficial to the company and field operations.

Strategic Plan

The objectives in this plan meet the client's needs of being able to distribute DEF at remote sites throughout the field. This research based project will address risks, requirements, availability and practicality that the client and stakeholders have requested. Research will be obtained through various mediums including consulting with vendors, DEF Distribution Project Team, consultations with other similar companies, information of product specifications and designs on the internet and face to face interactions with vendors. Minutes from meetings with vendors, the DEF Distribution Project Team and meetings with similar companies will be collected and archived on the shared drive on ConocoPhillips server. All information obtained will be the property of ConocoPhillips. Minutes from meetings will cover the questionnaire aspect of the research, as this project is so new to Kuparuk and the personnel issues will be discussed in a round table format and documented for lessons learned database.

Project Scope Statement

The DEF Distribution System Research and Recommendation project will provide research, product knowledge, vendor bids, engineering control information, operation and maintenance procedures and recommendation of which vendor and product(s) to purchase based on the requirements of the project. The research will include product availability, pros and cons of the product, engineering controls, EPA and state regulations research,

future implications and projections of the Diesel Exhaust Fluid (DEF) System, current usage of DEF, projected usage of DEF, risk management and mitigation, field logistical requirements, blast zone regulations and procedures.

Once the DEF Distribution System Research and Recommendation project has been completed and accepted, a secondary document and project management plan will be implemented to purchase, engineer, verify, transport and implement the system on the Greater Kuparuk Business Unit North Slope Oil Field. As a secondary project, the implementation of the DEF Distribution System Research and Recommendation project will be crucial in securing the safety of future project success.

Research will be conducted online, brochures and with direct contact with vendors by phone, email, fax, and face to face meetings all over the United States. Research will also be conducted with local experts on the Kuparuk Field in engineering, maintenance, environmental, and safety through face to face meetings, conference calls, and emails. Meeting minutes will be taken for face to face meetings, meeting agendas and a record of emails will be collected to trace the information to the requirements matrix.

The project(s) described in this document are not to exceed 8 months with the final turnover of deliverables to operations April 25th 2015. Assumptions for this project are that necessary support from the sponsor and committee will be sufficient to see the project completed. Necessity of the requirements of the system will ensure the projects' success and resolve of the sponsor due to the previous purchase of heavy equipment requiring the product and requiring the product move to the equipment staged around the field.

Research Instruments

The project will utilize three components into the research. Academic papers from various sources will discuss in detail the legal requirements and the product information for dispensing and storage. The second research medium will derive from face to face meetings with the DEF Distributions System project team in which meeting minutes will be kept and discussion points will be addressed as well as the collection of research (including statistical analysis) from the other project team members. Thirdly the project research will collect data from the vendors who utilize engineering teams to design products and are familiar with the legalities involved in DEF Distribution Systems. Correspondence, and meeting minutes will be kept and archived for future reference as the project matures into a future phase of procurement.

Academic Papers

Academic Papers collected from various sources such as the Department of Energy, the state of Alaska, The Environmental Protection Agency and various vendors will provide system requirements, legal specifications, technical specifications and handling specifications which all pertain to the selection of a dispensing product. These papers will assist in the recommendation process of the research project by ensuring that the product chosen at project's end will meet the requirements and specifications that the sponsor requires to be in compliance with local, state and federal laws. The research will also assist in the decision process by examining what would be the best fit for handling, operating and maintain the system with a set of Standard Operating Procedures.

Meeting Minutes

Meeting minutes will serve in the research project as written documentation of issues discussed, research markers, concerns resolution, and requirements building. Meeting minutes are an excellent forum to archive and provide ample information as to the discussions held by the DEF Distribution System Research and Recommendation Team and various vendors who attended via conference call. Meeting Minutes will track issues, who had which issue, what the issue was and the consensus on how to handle said issue.

Vendor Correspondence

This project requires specification and technical elements that vendor manufacturers have already engineered out. Legal stipulations, handling requirements, and product specification information can be derived from the vendors and verified with our in house teams and cross referenced with other vendors. Tracking correspondence and archiving correspondence of product specifications, engineering drawings, bid sheets and proposals will provide significant information for the sponsor to make a decision.

Research Evaluation Process

Meeting Minutes and correspondence between vendors and the DEF Distribution System will be evaluated on a matrix that details the issues in the discussion. The matrix will provide information on the meeting and the topics that were discussed and the consensus the group reached on a given topic. An issue will be raised and that issue will be documented in the minute. The issue will be added to the matrix and categorized as to the type of issue e.g. functional, business, logistic, inadequate etc. The next category will discern who had the issue and rank relevance to the project, the corresponding risk, and the mitigation; additionally the issue will note as to which type of research the mitigation should fall under. Finally it will rank the severity of the risk to the project and mitigation sequence on the risk register.

The result or outcome will be tracked and weighted depending on the view and result of the client. If the client is satisfied with the research, they will indicate that. Also, the matrix will indicate if the research led to a change in the project which adds weight to the line item. More than 50% Yes answers in the client satisfied column will indicate that the research methods are effective and the project is moving the right direction. Less than 50% means that the project is using the wrong research methods or that the methods in place are ineffective and the project is at risk. Multiple change order requests means that the research is also not effective enough. If as a result of change order 50% or more change order requests are issued, the research methods are being ineffective and must be re-evaluated.

Research Evaluation Matrix

Item#	Issue/Concern/Requirement	Requirement	Stakeholder	Power	Risk ID #	Mitigation #	Risk Severity	Research Method	Client Satisfied? Y/N	Change Order Requested? Y/N

Results

The result or outcome will be tracked and weighted depending on the view and result of the client. If the client is satisfied with the research, they will indicate that. Also, the matrix will indicate if the research led to a change in the project which adds weight to the line item. More than 50% Yes answers in the client satisfied column will indicate that the research methods are effective and the project is moving the right direction. Less than 50% means that the project is using the wrong research methods or that the methods in place are ineffective and the project is at risk. Multiple change order requests means that the research is also not effective enough. If as a result of change order 50% or more change order requests are issued, the research methods are being ineffective and must be re-evaluated.

ConocoPhillips Alaska
DEF Distribution System
Research and Recommendation
Project

ConocoPhillips

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Statement of Work

Project Management Plan
August 19, 2014

Project Management Department, University of Alaska Anchorage

Introduction/Background

In an effort to act in accordance with environmental control systems now being implemented on diesel equipment, this document displays strategies to procure, distribute, maintain and control urea based products on heavy equipment at Kuparuk. New equipment built after 2010 comes equipped with Selective Catalytic Reduction (SCR) technology based on urea diesel exhaust fluid and a catalytic converter to significantly reduce oxides of nitrogen (NOx). SCR is the leading technology being used to meet 2010 emission regulations.

Diesel Exhaust Fluid (DEF) is the reactant necessary for the functionality of the SCR system. It is composed of 32.5% high purity urea and 67.5% deionized water. Urea is a compound of nitrogen that turns to ammonia when heated. DEF purchased should display the certification of the American Petroleum Institute (API), German Institute of Standardization DIN70700, The International Organization for Standardization ISO22241-1 and meet AUS – 32 specifications. DEF weighs approximately 9 lbs. per gallon. Currently there are no additives that can be added to DEF to keep it from freezing and maintain its integrity to assist in reducing emissions.

DEF should be stored in a cool, dry, well-ventilated area, out of direct sunlight optimally at 77 deg F. Higher temperatures have shown little impact on affecting the quality of DEF. However, the shelf life of DEF is a function of ambient storage temperature. DEF will degrade over time depending on temperature and exposure to sunlight. Expectations for shelf life as defined by ISO Spec 22241-3 are the minimum expectations for shelf life when stored at constant temperatures. If stored between 10 and 90 deg F, shelf life will easily be one year. If the maximum temperature does not exceed approximately 75 deg F for an extended period of time, the shelf life will be two years. A 32.5% solution of DEF will begin to crystallize and freeze at 12 deg F (-11 deg C). At 32.5%, both the urea and water will freeze at the same rate, ensuring that as it thaws, the fluid does not become diluted, or over concentrated. The freezing and unthawing of DEF will not cause degradation of the product.

All DEF packages will have a date code located somewhere on the product. The date code will allow you determine the date the DEF was made. 1 gallon containers will have a laser code imprinted on the bottle. 2.5 and 5 gallon containers have a small date code label applied to the bottle. Drum and totes will have a label applied to either the top or side of the product. DEF is a nontoxic, nonpolluting, non-hazardous and nonflammable solution. It is stable, colorless,
and meets accepted international standards for purity and composition. DEF is safe to handle and store and poses no serious risk to humans, animals, equipment or the environment when handled properly. MSDS sheets are currently available on cumminsfiltration.com

The standard nozzle diameter for dispensing DEF has been designed at 19mm versus the standard diesel fuel nozzle diameter which is 22mm. In addition, the tank cap for the DEF tank will be blue to further differentiation from the diesel tank. The SCR system will

recognize solutions other than DEF, and the DEF indicator light will appear notifying the driver. Depending on the level of contamination in the tank, the vehicle may require servicing.

DEF consumption will be approximately 2% of the diesel fuel consumed. Another way to consider it is that DEF will be consumed on a 50 to 1 ratio with diesel. (For every 50 gallons of diesel fuel burned, you will use 1 gallon of DEF). If you know the average fuel consumption of a vehicle, you can easily calculate the amount of DEF that will be used. The DEF dose rate will vary slightly amongst engine manufacturers. While most engines will have a dose rate of 2% of diesel fuel consumed, the dose rate will range from 1% to 3%.

Heavy Duty Expected Usage

- Annual miles for average truck = 120,000 miles
- MPG for average truck = 6 mpg
- 120,000 miles / 6 mpg = 20,000 gallons diesel fuel per year
- DEF usage @ 2% of fuel consumption = 400 gallons of DEF / year
- 400 gallons / 20 gallon tank (average size) = 20 DEF fill-ups / year

Light Duty Expected Usage

- Annual miles for average truck = 50,000 miles
- MPG for average truck = 8 mpg
- 50,000 miles / 8 mpg = 6,250 gallons diesel fuel per year
- DEF usage @ 2% of fuel consumption = 125 gallons of DEF / year
- 125 gallons / 10 gallon tank (average size) = 13 DEF fill-ups / year

Currently, the Kuparuk field utilizes the Oilers bay and the 400 gallon tank installed at that location to resupply heavy equipment. It is supplemented by the purchase and distribution to various crews in 2.5 gallon jugs. Over the next several years, the anticipated use of DEF will increase dramatically as newer pieces of equipment are being added to field operations.

It is the intent of this document to outline the project strategies to effectively meet the increasing demand for DEF while ensuring that the extreme climate does not affect operations of heavy equipment or operations on the Kuparuk field.

Scope of Work

The scope of this project is to research and recommend a DEF Distribution System. It will be rolled out through different phases that include: research, initiating and planning, Contacting vendors, receiving bids, developing a product system draft and making a recommendation. As the need for urea increases, researching a plan to accommodate those needs will be the focal point of the project. Recommending a product and system that will meet the client/sponsor's needs is the purpose of this project. There will be distinct milestones reflected by key performance indicators; the continuation of the project; and the client's attitude and perception of the project in determining if it meets the business need.

Period of Performance

The period of performance for the DEF Distribution System Research and Recommendation project is 8 months beginning on 8 August, 2015 through 28 August

2015. All work must be scheduled to complete within this timeframe. Any modifications or extensions will be requested through COPA, AES, and UAA for review and discussion.

Place of Performance

The project is specifically for the Greater Kuparuk Business Unit and will take place at the Kuparuk Industrial Complex. Weekly meetings will be on a 3 week rotation and will commence on Wednesdays at 1 pm in the KIC small conference room.

Work Requirements

As part of the DEF Distribution System Research and Recommendation project the Project Manager will be responsible for performing tasks throughout various stages of this project. The following is a list of these tasks which will result in the successful completion of this project:

Kickoff/Initiating and Planning:
Project Manager will create and present detailed project plan including schedule, WBS, procurement plan, implementation plan, and maintenance plan.
Project Manager will present plan to COPA for review and approval.

Research Phase:
Work with COPA to gather requirements and establish metrics
Create system design based on collected requirements
Develop system design proposal for COPA review and approval
Present written status at weekly meeting

Build Phase:
- Project Manager will provide COPA with a detailed research plan
- Project Manager will conduct inspections on all documentation
- Project Manager will resolve any requirement issue and inspection issues identified in system
- Project Manager will compile a progress report to present to COPA and UAA for review/approval
- Present written status at weekly and bi-weekly UAA meeting

Implementation Phase:
- Project Manager will demonstrate features of the researched products through requirements matrix, schematics and bids
- Present written status at weekly meeting and bi-weekly UAA meeting

Project Handoff /Closure:
- Project Manager will provide COPA with all documentation in accordance with the approved project plan
- Project Manager will present project for review and approval to COPA and UAA
- Project Manager will complete the project requirements checklist showing that all project tasks have been completed
- Project Manager will conclude system recommendations on the final day of the period of performance
- Present written status at weekly meeting and bi-weekly UAA meeting

Schedule/Milestones

The list below consists of the initial milestones identified for the Website Redesign Project:

Milestone Schedule - List	
Project Milestone	Target Date
Project Initiation	9/1/14
Research Phase	9/4/14
Planned Budget Review	10/1/14
First Go/No-Go Decision	10/24/14
Final Project Decisions	11/17/14
Second Go/No-Go Decision	11/21/14
Hand off to Procurement	12/1/14
Final Deliverables Due	12/10/14

Acceptance Criteria

For the Urea Distribution Project the acceptance of all deliverables will reside with the CPA Field Services Superintendent and the Project Coordinator (PC) of the Project Manager. The PC of the Project Manager will maintain a small team of three advisors (Master Mechanic, Superintendents, Support General Foreman) in order to ensure the completeness of each stage of the project and that the scope of work has been met. Once a project phase is completed and the Project Manager provides their report/presentation for review and approval, the CPA Superintendent will either sign off on the approval for the next phase to begin, or reply to the Project Manager, in writing, or by meeting advising what tasks must still be accomplished.

Once all project tasks have been completed, the project will enter the handoff/closure stage. During this stage of the project, the Project Manager will provide their project closure report and project task checklist to the CPA Field Services Superintendent. The acceptance of this documentation by CPA's Field Services Superintendent will acknowledge acceptance of all project deliverables and that the Project Manager has met all assigned tasks.

Any discrepancies involving completion of project tasks or disagreement between CPA and the chosen Project Manager will be referred to both organizations' contracting offices for review and discussion.

ConocoPhillips Alaska
DEF Distribution System Research and Recommendation Project
Phase II Procurement

ConocoPhillips

Alaska's Oil & Gas Company

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Change Management Plan

April 28, 2015

Project Management Department, University of Alaska Anchorage

TABLE OF CONTENTS

INTRODUCTION

The Change Management Plan for the DEF Distributions System Procurement project is in place to communicate the expectations on how changes will be managed, describe actions that require change, and to describe the definitions of the change and how it will impact the project. The Change Management Plan describes the purpose and role of the project committee, and the change management process. All stakeholders will be expected to submit or request changes in accordance with this Change Management Plan and all requests and submissions will follow the process detailed in this document.

CHANGE MANAGEMENT APPROACH

The Change Management approach for the DEF Distribution System project will ensure that all proposed changes are defined, reviewed, and agreed upon so they can be properly implemented and communicated to all stakeholders. This approach will also ensure that only changes within the scope of this project are approved and implemented. By complying with this approach, unnecessary changes and resource expenditures will be circumvented.

The change management approach consists of three areas:

- Certification that changes are within scope and beneficial to the project
- Determine how the change will be implemented
- Manage the change as it is implemented

DEFINITIONS OF CHANGE

There are several types of changes which may be requested during the project lifecycle. Contingent on the impact of the proposed change to the project, changes to project documentation and communication of these changes will be required. The communication of the changes will include any approved changes to the project plan and ensure all stakeholders are notified.

Types of changes include:

Scheduling Changes: these are changes which will impact the approved project schedule. These changes may require fast tracking, crashing, or rebase-lining the schedule depending on the significance of the impact. Adding buffers and lag time may result as a consequence to these proposed changes. These changes may require revision to WBS, project Gantt chart, scope statement, and other project documentation as necessary

Budget Changes: these are changes which will impact the approved project budget. These changes may require requesting additional funding, releasing funding which would no longer be required or adding to project or management reserves. At this time there is no defined budget. The budget is currently in the opinion of what the field supervisors feel they can reasonable request and has not been disclosed.

Scope Changes: these are changes which are necessary to keep the project on track and impact the project's scope, which may be the result of unforeseen requirements which were not initially planned for. These changes may also impact budget and schedule. These changes may require revision to WBS, project scope statement, and other project documentation as necessary.

It is the responsibility of the project manager to ensure that any changes implemented are communicated appropriately to the project stakeholders. In addition, as changes are approved, the project manager must ensure that all changes are captured appropriately and documented in the correct corresponding documents. Document updates must then be communicated to the project team and stakeholders as stated in the Communications Management Plan. Adhering to the appropriate correspondence and method as indicated in the Communications Management Plan is the responsibility of the project manager.

PROJECT COMMITTEE

The Project Committee is the approval authority for all proposed change requests pertaining to the DEF Distribution System project. The committee will review all change requests, determine their impacts on the project risk, scope, cost, and schedule, and to approve or deny each change request. The following chart provides a list of the committee members:

Name	Position	PC Role
Mike McDonough	Project Manager	PC Chair
Roger Hull	PM Advisor	PC Co-Chair
LuAnn Picard	PM Committee	PC Member
Seong, Kim	PM Committee	PC Member
Les Hardesty	Sponsor	Sponsor
Ray Chumley	Sponsor	Sponsor

Sponsor and stakeholder change requests will be captured by the project manager and input into the system. Analysis of the change request will occur in accordance with this Change Management Plan. The project manager will determine if the change request requires a group meeting by the project committee or by other methods of discussing the changes. Changes will not be implemented until all parties are in agreement through a mediation process. All changes to scope, schedule or budget (if applicable) must also have an approval by the project sponsor after the committee approval.

ROLES AND RESPONSIBILITIES

The following are the roles and responsibilities for all change management efforts:

Project Sponsor:

- Approve all changes to budget/funding allocations
- Approve all changes to schedule baseline
- Approve all changes in project scope
- Approve all requirements changes
- Approve all vendor changes
- Approve all bids and proposals

Project Manager:

- Receive and document all change requests from project stakeholders
- Conduct preliminary risk, cost, schedule, scope analysis of change prior to committee review
- Obtain clarification from change requestors on issues or concerns
- Make documentation revisions/edits as necessary for all approved changes
- Facilitate meetings for the Project Committee

Project Committee:

- Conduct review of risk, cost, schedule, scope analysis of proposed changes
- Seek clarification from change requestors on any open issues or concerns
- Make documentation revisions/edits as necessary for all approved changes
- Participation

CHANGE REQUEST FORM

Project Title: Date Prepared:

Person Requesting Change: Change Number:

Category of Change:			
Scope ☐ Quality Requirements ☐			
Cost ☐ Schedule Documents ☐ ☐			
Detailed Description of Proposed Change:			
Justification for Proposed Change:			
Impacts of Change:			
Scope	Increase	Decrease	Modify
Description:			
Quality	Increase	Decrease	Modify
Description:			
Requirements	Increase	Decrease	Modify
Description:			
Cost	Increase	Decrease	Modify
Description:			
Schedule	Increase	Decrease	Modify
Description:			
Project Documents:			
Comments:			
Disposition	Approve	Defer	Reject
Justification:			
Project Committee Signatures:			
Name	Role	Signature	Date

Project Stakeholders:
Submit all change requests on standard organizational change request forms
Provide all applicable information and detail on change request forms
Be prepared to address questions regarding any submitted change requests
Provide feedback as necessary on impact of proposed changes

CHANGE CONTROL PROCESS

The Change Control Process for the DEF Distribution System Project will follow the organizational standard change process for all projects. The project manager has overall responsibility for executing the change management process for each change request.

Stakeholders will identify a change– They will submit a completed change request form to the project manager.

Project Manager will document and Log change in the change request register– The project manager will keep a log of all submitted change requests throughout the project's lifecycle.

Project Manager, Project team and the requestor will evaluate the – The project manager will conduct a preliminary analysis on the impact of the change to risk, cost, schedule, and scope and seek clarification from team members and the change requestor.

Project Manager will submit change request to the Project Committee– The project manager will submit the change request, as well as the preliminary analysis, to the Project Committee for review.

The Project Committee will make a decision on change request– The Project Committee will collaborate and review the change request and decide if the change shall be approved.

Project Manager will gain sponsor approval on change request– The Project Sponsor will review the proposed change and the committee findings and issue an approval.

The Project Manager will implement change– If the change is approved, the project manager will update and re-baseline the project documentation as necessary.

CHANGE REQUEST LOG

Project Change Log						
ID	Category	Description of Change	Submitted by	Submission Date	Status	Disposition

DOCUMENT CONTROL

Name	Date	Revision
Mike McDonough	01/29/2015	1

SPONSOR ACCEPTANCE

The signatures of the individuals below indicate an understanding in the purpose and content of this document by those signing it.

Approved by the Project Sponsor: Date:

<Project Sponsor>
<Project Sponsor Title>

ConocoPhillips Alaska
DEF Distribution System Research and Recommendation Project

ConocoPhillips
Alaska's Oil & Gas Company

ONE CREW · ONE JOURNEY

Procurement Management Plan

April 28, 2015

Project Management Department, University of Alaska Anchorage

Procurement Plan

Project Name	DEF Distribution System Research and Recommendation
Performing Division	ConocoPhillips Field Services
Performing Group	AES 625 Field Services
Product	DEF Distribution System

Prepared By

Document Owner(s)	Project / Organization Role
Mike McDonough	Project Manager

Procurement Plan Version Control

Version	Date	Author	Change Description
1.0	2/8/15	Mike	N/A

Vendor Selection

Vendor Selection
Vendors will be obtained based on quality, reputation, timeliness in delivery and ease of customer satisfaction.

Procurement Description

Procurement Description
2..... DEF Custom built DEF Dispensing Trailers 3 .....100 gal. "JOBOX" Custom built DEF dispensing Systems 4..... Stationary Custom Built DEF Dispensing Heated cabinets with containment
All three systems are being conceptualized and bid on simultaneously with the Interim system to be purchased and delivered first and the larger remaining systems to be purchased at TBD date in the future.

Selection Process & Criteria

Selection Process & Criteria
The bidding system will be in place for construction tasks. History of the Vendors will be reviewed for length of time in business and like clients they conduct business with . Vendors will also be reviewed and an analysis of past performance will be analyzed in any dealings with similar clients. All bids will be reviewed. (up to 3)

Procurement Team

Procurement Team
[List all Stakeholders who are involved in the Procurement Process, along with contact information and a description of their Procurement Role (e.g., Project Manager, Legal, PPS Contract Administrator, CITC Administrative Services Officer, etc.).]

Name	Phone / Email	Procurement Role
Mike McDonough	907 659 3924	Manager
Steve Greer	907 659 2099	Assistant

Contract Type(s)

Contract Type(s)
Fixed Price with award will be used for purchase contracts.

Contract Standards

Contract Standards

Specific milestones and KPI indicators will determine the awards given in the purchase phase of the project. If the Vendor meets the CPI and SPI at completion, there product will be weighted higher in the decision making process.

Decision Criteria

The criteria for the selection and award of procurement contracts under this project will be based on the following decision criteria:
Design: Price=75%, Completion date= 15%, Past performance= 10%, on a 100 pt scale. The second lowest price would be given less than 75 points as a ratio of their price to the first lowest bidder. For instance a 100k bid would be given 75 points, while a 110k bid (10% over) would be given a score of 67.5 points (10% under). The same would go for the completion date. If a firm could complete the design faster than our March 20th deadline, they would be given the highest score of 15 with the later completions scaled down from there. The past performance score would be 1-10 based on the quote review team's analysis.

Marketing: Past Performance 40%, Range of Services 30%, Estimated Price 20%. Other items 10% (professionalism, uniqueness, etc). These would all be evaluated by a project team and would be given points (1-40 points for past performance, etc) based on the review.
The vendor's who have regularly conducted business with ConocoPhillips will be valued slightly different with the relationship being the forefront of the scale. In addition, research on quality and their relationship with the client for being a reputable vendor who follows the requirements will be additionally scored.

2.9

Enterprise Environmental Factors

This project has the approval of ConocoPhillips Alaska. Completion of this project is essential to the success of COPA field services. This Project has the resources of Field Services, however, management of this project will be a showcase of performance the University of Alaska Anchorage. It is vital that Field Services adequately manages the funds and project milestones within the confinement of key performance indicators.

APPROVALS

Prepared by _____
Project Manager

Approved by _____
Project Sponsor

_____
Executive Sponsor

_____
Customer

_____
Customer

_____
Customer

Approval Date _____

Knowledge Areas

Knowledge Area Selection

Project Procurement Management:

This project is unique. It has not been done before. The DEF product, while being used currently, has not been dispensed in such a large area in such extreme temperatures. Currently, manufacturers have listened to our needs and requirements and are having to engineer out the unique specifications we need here on the slope. Success will be monitored by finding a product and manufacturer who is willing and able to meet our proposed needs and be able to deliver a product to our location by a specified time. A matrix will be created listing out the capabilities and dependability on these vendors as part of our decision making process.

Project procurement success will be measured in accordance with how much it will meet the project requirements. Procurement will be based on the research and work done with the vendors to propose a system that meets all legal, engineering and environmental needs as well as meeting the mobility needs of the sponsor. The target of the procurement end of the project is to meet as many traceable requirements as possible so the sponsor can make a well educating decision for which system to buy. If the sponsor has inadequate information, then the sponsor cannot make the best decision with the company's strategic goals in mind. This would result in a failure of this process.

The procurement management portion of this project has already been expanded in meeting with several different vendors and distributors. Additionally, since whichever product will be selected, it must be engineered to meet our specific needs since current products are being manufactured in the continental United States and do not have the harsh arctic climate as a factor in their current designs. Language and terminology has been a factor in communication between parties as the language used in describing the possible units for purchase must align to ensure a product will be built to the client's needs. A matrix has been constructed to ensure the vendor can meet the requirements with the understanding of the client's needs

Project Communications Management:

Many different departments will be involved in the process. ConocoPhillips, AES Field Services, AES Heavy Shop and AES Field support are the main departments most heavily involved in this project. As this project includes operations, maintenance, procurement, training, and assessments; communications between all departments is essential to ensure that the product being purchased, meets everyone's needs. This poses a unique challenge as all possible systems that may be used and purchased will be new to the industry to meet our unique needs.

Communications will be measure with the vendors and project team based on frequency and adherence to requirements in the proposals submitted by the vendor. If the vendor fails to understand the requirement and bids are received on the grounds of misunderstanding, then this aspect of the project will fail. Ideally the vendors will be able to produce schematics, proposals and bids based upon traceable requirements by the team and sponsor that align with the company's strategic goals.

Communication has been the largest impact on this project. With several department heads as part of the team, various engineers and environmental personnel being involved, importance and stresses on specific verbiage has been a factor in making sure every department has the same understanding of the product desired. Additionally, communicating the various verbiage used between team members to the vendor and ensuring the same understanding of the requirements has been a challenge. Terminology utilized for specific requirements has been the weak point in the communication process. To mitigate this issue a dictionary of key terms and verbiage has been composed and will be expanded. The dictionary describes which vendor or party uses what terminology and what the different terminology has as an emphasis on importance.

Project Time Management:

This project must meet time requirements as it is essential that a system be put in place by summer 2015. This poses a unique challenge as all manufacturers of various products are in the Continental United States and must get their products engineered, manufactured and shipped to the North Slope in a timely fashion. Vendor's capability of meeting this requirement will be assessed in the vendor matrix.

Time is a factor in this project. If all requirements and proposals conducted by the project team and vendors cannot be completed on time, then the sponsor will not be able to make a decision on which project to buy and what products will align with the company's strategic goals. If the vendors have enough information to produce a proposal that meets the requirements in the allotted time of the project then the project will be a success.

Time has been a factor. As the project progresses, the need for the various team members to take on more responsibility and roles has increased. To combat time constraints reallocation of resources has been utilized. As the team is on rotational schedules and time is limited on what they can spend on this project, the need to involve various team members in having direct contact with the vendor is needed. The lessons learned document will reflect these resource reallocations for future study and reference.

Project Quality Management:

As this is a new project with new requirements that are unique to our extremes, quality is essential. The need for a robust system that does not fail in harsh climates is also a unique challenge. The product must be easily set up for our maintenance requirements here on the North Slope. Quality will be determined by the quality of bids with engineering specifications that meet our requirements. It will also be assessed in accordance with performance on the North Slope while out in the field which will come at a later phase in the project. Quality cannot be compromised in this project as there are unique environmental control factors in the location in which it will be used. In the vendor matrix, it will determine the level to which the manufacturer can meet the requirements.

Quality management is essential to the project. The project is producing research and recommendations and the research and recommendations must be sufficient enough to provide enough information on traceable requirements for the sponsor to make strategic decision that meets the needs of the company's strategic goals. The target is to provide the sponsor with relative and exact information that a decision can be reached that supports the project's goals.

Quality management has been a factor in this project. As the system desired by ConocoPhillips is a new system and never been built for the conditions of the extreme arctic, quality in communication, time management and in requirements has required the construction of several matrices to ensure all stakeholders have their needs met. Quality is a factor in every element of this project to ensure the information and processes used to obtain the information are going to satisfy the client's expectations.

APPROVALS

Prepared by _____
Project Manager

Approved by _____
Project Sponsor

_____
Executive Sponsor

Key Terms

Key Term #	Key Term	Definition	Requirement Impact	Function
1	COP	**ConocoPhillips** - Oil and gas company	1 ~ 7	Business
2	COPA	**ConocoPhillipsAlaska**- Oil and Gas company North Slope	1~7	Business
3	ASRC	**Arctic Slope Regional Corporation** - Main Operations and Maintenance Company Contractor to handle O&M on the Kuparuk Field	8~16	Business
4	AES	**ASRC Energy Services** - ASRC Subsidiary to handle O&M operations on the North Slope of Alaska	8~16	Business
5	DEF	**Diesel Exhaust Fluid** - DEF is the reactant necessary for the functionality of the SCR system. It is a carefully blended aqueous urea solution of 32.5% high purity urea and 67.5% deionized water.	1~16	Product
6	SCR	**Selective Catalytic Reduction** - SCR is a technology that uses a urea based diesel exhaust fluid (DEF) and a catalytic converter to significantly reduce oxides of nitrogen (NOx) emissions. SCR is the leading technology being used to meet 2010 emission regulations	1~16	Function
7	API	**American Petroleum Institute** - API Certification is a voluntary program established by the American Petroleum Institute (API) which certifies and monitors that diesel exhaust fluid meets ISO specifications. The program was launched in March 2009. Cummins Filtration DEF currently meets ISO specification and is also API certified.	1~16	Business
8	IBC	**Intermediate Bulk Containers** - Intermediate Bulk Containers (IBC) are all containers larger than a 55 gallon (207L) drums, and smaller than a tanker	1~16	Function

Key Terms

9	Tote	**Stainless Steel Vessel for transporting and holding DEF** - The 275 gallon tote is disposable and primarily used for refilling of the larger plastic refillable tote. However, if customers do utilize the 275 gallon tote the transfer equipment must be DEF compatible and completely free of contaminants. Stainless steel and high density polyethylene plastic are DEF compatible materials.	2,3	Function
10	Micro Matic	**Valve System for Closed Tote Systems** - Micro Matic is recognized in the DEF marketplace as Closed System Solution providers for single use and multi-use container valve systems. Providing economical solutions for operations that require One Way, Returnable/Refillable and On-site Refilling, Micro Matic can assist in delivering consistent DEF purity, ensure packaging integrity and maximize operational efficiencies throughout the supply chain from fill to dispense.	2,3	Function
11	Closed Tote System	**Tote Dispensing System** - A third liquid-dispensing approach is the "closed" or sealed system, and this is a significantly safer approach than either the open or semi-closed methods. Closed systems rely on a pump to draw the media from the container and deliver it to the end process.	2,3, 13	Function
12	Mod.	**Module** - Structure designed to house a specific process or function.	1~7, 9,10~13	Function
13	Skid	**Skid** - Platform or base/foundation for the Module to sit on.	1~7, 9,10~14	Function
14	Picking Eyes	**Picking Eyes** - Fixture on the Module with an eyelet for feeding a shackle or other device through for the purposes of lifting the Module with a crane.	1~7, 9,10~15	Function
15	Fork Pockets	**Fork Pockets** - Built into the skid allows a forklift or loader to slide forks into the skid structure to lift the skid and module of the ground.	1~7, 9,10~16	Function
16	Tank Farm	**Tank Farm** - A collection of tanks above ground staged in one localized area	1~7, 9,10~17	Function

Key Terms

17	Cummins Engine	**Cummins Engine** - Leading manufacturer od Deisel Engines in the United States and several other world markets. Has done extensive research on DEF and the exhaust systems in their motors	1~7, 9,10~18	Research
18	LED Light Systems	**LED Light Systems** - Approved lighting systems for operating in classified areas. They are light systems that can be used around these areas because they are intrinsically safe.	1~7, 9,10~19	Function
19	Inverter	**Inverter-** Power inverter used in many applications. In this case it refers to a unit that can toggle between multiple sources and use the power supply on the vehicle to power the DEF unit.	1~7, 9,10~20	Function
20		**Dieselforum.org**- Forum where research and question come into place and manufacturers answer customer questions about products, specifications, technicalities and other various related questions.		Research

There are several new additions to the definitions chart which include research sources and definitions of terms found in the project and research paper.

Introduction – Project Charter

ConocoPhillips DEF Distribution System
Memo
To: ConocoPhillips
From: Michael McDonough
Date: January 05, 2015
Re: Project Charter to Procure a DEF Distribution System on the Greater Kuparuk Business Unit

Executive Summary

This project is a procurement project based on research from a prior project conducted earlier in the latter half of 2014. The procurement aspect of this project is geared towards a new Diesel Exhaust Fluid Distribution System for the Greater Kuparuk Business Unit. The sponsor, ConocoPhillips Alaska has purchased new tier IV heavy equipment that according to The Environmental Protection Agency requires these new vehicle to meet an emission standard lower than the previous models or tier III. Most all manufacturers went to a system which injects Diesel Exhaust Fluid into the emission system. This additive greatly reduces carbon emissions. The Kuparuk oil field located on the shoreline of Alaska's North Slope is a remote location. Future projects will revolve around staging heavy equipment in remote sites all over the Kuparuk field. This will require a distribution system as it is impractical to transport the heavy equipment to a DEF station. DEF is a sensitive material requiring that it be continuously held within a small range of temperature per product specification. This temperature range is between 32 degrees F and 77 degrees F or it runs a high risk of becoming ineffective to the emission system. The only current method of delivering DEF is in 2.5 gallon jugs. As the need for DEF increases, these jugs will be ineffective for distributing the product.

Project Purpose/Justification

There are several different system products for achieving the project objective, however, none of these systems are engineered and designed to meet the harsh climate challenges found on the North Slope of Alaska where temperatures can occasionally drop in excess of 60 degrees below zero. The harsh winter climate of the North Slope makes distribution of DEF very sensitive in maintaining the integrity of the product.

This project's aim will determine the product specifications of not only the product (DEF) but also the system of distribution. The project will determine all stakeholder requirements and needs and provide the research and mitigation tools to meet specified needs and mitigate potential risks and constraints. The research will be conducted on several platforms from documentation to vendor expertise. Upon conducting the research and providing information to stakeholders, the conclusion of the research will produce a recommendation to the client for which vendor and product will meet all stakeholder requirements. This recommendation based on research and feedback from stakeholders will be the basis for the client to draw conclusions and make a procurement decision.

Business Need/Case

To refuel heavy equipment staged at various remote sites for future projects, the DEF product must find its way to the heavy equipment staged at remote sites. There are many future projects for operations and maintenance as well as exploration planned in the coming years. New equipment with DEF as part of the exhaust system has already been purchased and is anticipated to arrive this winter. Currently, there is not a system at Kuparuk that can deliver DEF to these new vehicles.

Business Objective

The objective is to research and contact vendors that can meet the unique challenges of the North Slope climate. There are several methods currently being used for distributing DEF but the objective is to find a vendor who can meet our requirements. This will include research in ensuring that our requirements are within legal laws and limits and within the safety culture of the field and identifying various requirements for performance and maintenance needs.
Complete the research and recommendation project by December 2014 in order for the sponsor to make a decision for procurement.
Use the research and recommendation project as a guideline and reference during the next project of procurement of a DEF system scheduled for January 2015.
Complete matrices in document control to ensure there is no miscommunication between our project management team and the vendor.
Trace all requirements of the system and ensure they are meeting the sponsor's needs.

Project Description

The Diesel Exhaust Fluid Distribution System will provide research on three specific methods for distributing the DEF product. Through the research, vendors will be contacted and Requests for Proposals will be asked to be provided from the vendors. Engineering controls, safety measures, environmental and permitting requirements will also be researched to ensure the product meets all requirements.

Project Objectives and Success Criteria

Objectives for the success of this project will include the following:

- Sponsor acceptance by September 19th 2014.
- Selection of vendors and system products by October 3rd 2014.
- Research completed on all traceable requirements by November 17th 2014.
- Final decisions on product by December 1, 2015.
- Handoff to procurement by December 10, 2014.

Requirements

- The requirements for this project to succeed are as follows:
- The research must provide enough information for the sponsor to make a decision on which system to buy.
- The research must be presented in terms the sponsor and stakeholders understand.
- The recommendation must be secured by December 1, 2015.
- All deliverables must be turned in with the class syllabus requirements.
- Any additional requirements may be added with sponsor approval as the project progresses.

Constraints

- The system, whichever is selected must meet all engineering, legal and environmental requirements.
- The system, whichever selected, must be able to keep the product in a limited temperature range.
- The System, whichever selected, must be mobile and robust enough to be self-sufficient and self-contained.

Assumptions

The sponsor is in full support of this project's objectives.
Stakeholders have an equal and mutual interest in seeing the project through to handoff.
Vendors will be able to provide a proposal within the timeline of these projects objectives.
There is a product that can meet our needs or that one could be engineered to meet the project's needs.
Vendors will provide supplemental expert and proprietary information for the purposes of the bidding process.

Project Management

Michael McDonough, the assigned Project Manager has the overall authority and responsibility for managing and executing the project. This includes any all work related tasks and any project related research. The project committee, consisting of several department and functional managers and UAA MSPM group will assist the Project Manager with various tasks as needed. The Project Manager will work closely with the sponsor and stakeholders to ensure requirements are being met and the project stays within scope. Project and management plans will be reviewed at regularly held meetings and approved by the project sponsor and committee. Funding will be decided by the project sponsor based on the validity of the research conducted in the project. The Project manager has the responsibility of driving the project by managing requirements, communications and progress/performance targets. Delegation of tasks and various approval authorities will be written between the project manager and the sponsor.

Project Scope

The DEF Distribution System Research and Recommendation project will provide research, product knowledge, vendor bids, engineering control information, operation and maintenance procedures and recommendation of which vendor and product(s) to purchase based on the requirements of the project. The research will include product availability, pros and cons of the product, engineering controls, EPA and state regulations research, future implications and projections of the Diesel Exhaust Fluid (DEF) System, current usage of DEF, projected usage of DEF, risk management and mitigation, field logistical requirements, blast zone regulations and procedures.

Once the DEF Distribution System Research and Recommendation project has been completed and accepted, a secondary document and project management plan will be implemented to purchase, engineer, verify, transport and implement the system on the Greater Kuparuk Business Unit North Slope Oil Field. As a secondary project, the implementation of the DEF Distribution

System Research and Recommendation project will be crucial in securing the safety of future project success.

Research will be conducted online, brochures and with direct contact with vendors by phone, email, fax, and face to face meetings all over the United States. Research will also be conducted with local experts on the Kuparuk Field in engineering, maintenance, environmental, and safety through face to face meetings, conference calls, and emails. Meeting minutes will be taken for face to face meetings, meeting agendas and a record of emails will be collected to trace the information to the requirements matrix.

The project(s) described in this document are not to exceed 8 months with the final turnover of deliverables to operations April 25th 2015. Assumptions for this project are that necessary support from the sponsor and committee will be sufficient to see the project completed. Necessity of the requirements of the system will ensure the projects' success and resolve of the sponsor due to the previous purchase of heavy equipment requiring the product and requiring the product move to the equipment staged around the field.

Product Scope Statement

The DEF Distribution System Research and Recommendation project will provide research into available products, EPA standards, Alaska state regulations, engineering specifications, operation and maintenance requirements, blast zone identification and requirements, bids, product description, and product handling research. The final document will provide sufficient data for the sponsor to make a decision on which product will fill the requirements best. The benefits of the product and its system accompanied by Standard Operating Procedures will provide the best insight for the sponsor to make the decision to procure.

Final Research and Recommendation document to include:

- Abstract
- Description of the issue
- Description of the research
- Description of project participants
- Description of project support
- Description of methods
- Description of organization of materials
- Description of results
- Conclusion and recommendation
- Appendices
- Meeting minutes
- Email chains
- Bids
- Engineering controls
- Schematics
- References
- Historical data

Results from the research and recommendation project will kick start a new procurement project. A Project Management Plan for procurement will derive from the research and recommend project. Request for Quote (RFQ) and Authorization for Expenditures (AFE) will be the driver for execution of the Procurement Plan put in place next semester.

Project Scope Management Plan

Scope management for the Project will be the responsibility of the Project Manager and Project Sponsor. The scope for this project is defined by the Scope Statement, Work Breakdown Structure (WBS) and WBS Dictionary. The Project Manager, Sponsor, and management team will establish and approve documentation for measuring project scope which includes deliverable quality checklists and work performance measurements. Proposed scope changes may be initiated by the Project Manager, Project Sponsor or any member of the team.

SCOPE VERIFICATION PLAN

The scope of the project will be verified with agreement by the team and sponsor on the deliverables, work breakdown and schedule of work. The scope of the project will continually be compared and managed to the baseline for variances from our approved business case. Changes will be monitored through the following actions:

- Interactions with team members – weekly reports, conversations, etc.
- Confirmation that deliverables are a priority and on schedule to complete
- Periodic quality inspections
- Monitoring purchase orders
- Field visits

Quality Management Plan

All members of the project team will play a role in quality management. It is imperative that the team ensures that work is completed at an adequate level of quality from individual work packages to the final project deliverable.

Risk Management Plan

The approach for managing risks for the ConocoPhillips Urea Distribution System includes a methodical process by which the project team identifies, scores, and ranks the various risks. Every effort will be made to proactively identify risks ahead of time in order to implement a mitigation strategy from the project's onset. The most likely and highest impact risks will be added to the project schedule to ensure that the assigned risk managers take the necessary steps to implement the mitigation response at the appropriate time during the schedule. Risk managers will provide status updates on their assigned risks in the weekly project team meetings, but only when the meetings include their risk's planned timeframe.

Upon the completion of the project, during the closing process, the project manager will analyze each risk as well as the risk management process. Based on this analysis, the project manager will identify any improvements that can be made to the risk management process for future projects. These improvements will be captured as part of the lessons learned knowledge base.

Risk Register/Assessment

ID	Category	Risk Description	Probability (%)	Impact	Exposure	Mitigation	Risk Response and Description
1	Schedule	Communication between Hitch Changes	90%	14 days	High	PM Shall call in regularly with alternate while on R&R	Set up work email at PM's home
2	Schedule	Information not relayed while PM is on R&R	75%	20 days	High	PM Shall call in regularly with alternate while on R&R	Additionally use of other forms of communication i.e. email
3	Schedule	Decision Makers not on site at the right time	50%	7 days	Med	PM Use of Outlook for all meetings and appointments	Obtain authorization to contact while they are conducting business off site
4	Cost	Custom build is too expensive	25%	120 days	Low	Regular check ups with vendors on their proposals	Research shall include alternatives of products and vendors
5	Function	Product can not meet all engineering requirements	66%	120 days	High	Research further for alternatives	Research shall include alternatives of products and vendors
6	Logistics	Product can not arrive on time	50%	6 months	Med	Adjust project to allow for this risk	Draft proposals for alternative site locations
7	Regulation	Blast zone issues on placement	50%	6 months	Med	Re-engineer product - add into proposal	Draft proposals for alternative site locations

Project Management Approach

The Project Manager, Mr. McDonough, has the overall authority and responsibility for recommending, managing and executing this project according to this Project Plan and its Subsidiary Management Plans. The project manager will work with all resources to perform project planning. All project and subsidiary management plans will be reviewed and approved by the project sponsor: ConocoPhillips Superintendents Field Services. All funding decisions will also be made by the project sponsor. Any delegation of approval authority to the project manager should be done in writing and be signed by both the project sponsor and project manager.

The project team will be described in a matrix, and team members from each organization will continue to report to their organizational management throughout the duration of the project. The project manager is responsible for communicating with organizational managers on the progress and performance of each project resource.

Project CSF and KPI

- Customer Satisfaction Factors
- Design the DEF Distribution System to fit with the company culture and needs to comply with the growing demand of urea and conduct the business in an environmentally prudent manner.
- Include internal input from functional managers and project sponsors to ensure management support and cultural buy in to a new Urea Distribution System
- Provide plan for new Urea Distribution System that covers developing standard Methods and Procedures as well as Management, and Maintenance and Support to ensure long-term success that can change and evolve with Best Practices.
- Provide stakeholder management to a level that keeps necessary parties involved, and aware with several opportunities for input as the project progresses

Key Performance Indicators

Stay within 10% Cost
Stay within 10% of Schedule

Schedule Management Plan

Project schedules for the Project will be created using MS Project 20010 starting with the deliverables identified in the project's Work Breakdown Structure (WBS). Activity definition

will identify the specific work packages which must be performed to complete each deliverable. Activity sequencing will be used to determine the order of work packages and assign relationships between project activities. Activity duration estimating will be used to calculate the number of work periods required to complete work packages. Resource estimating will be used to assign resources to work packages in order to complete schedule development.

Once a preliminary schedule has been developed, it will be reviewed by the project team and any resources tentatively assigned to project tasks. The project team and resources must agree to the proposed work package assignments, durations, and schedule. Once this is achieved the project sponsor will review and approve the schedule and it will then be base lined.

Change Management Plan

Any team member or stakeholder may submit a change request for the Project. The Project Sponsor will approve any changes to project scope, cost, or schedule must meet his approval. All change requests will be logged in the change control register by the Project Manager and tracked through to completion whether approved or not.

Communications Management Plan

The Project Manager will take the lead role in ensuring effective communications on this project. The communications requirements are documented in the Communications Matrix. The Communications Matrix will be used as the guide for what information to communicate, who is to do the communicating, when to communicate it, and to whom to communicate.

Stakeholders will be categorized based on their organization, department or contribution type. Stakeholders will be organized and then they will be positioned in a power/interest matrix to represent the potential impact each stakeholder may have on the project. Based on the placement a stakeholder analysis matrix will be complete which illustrates the concerns, level of involvement, and management strategy for each stakeholder.

Stakeholders will be categorized based on their organization, department or contribution type. Once all stakeholders have been categorized, they will be positioned in a power/interest matrix to visually display the potential impact each stakeholder may have on the project. Feedback from the stakeholders will contribute to the determination to be made to involve key stakeholders on committees, gate reviews, milestones reviews or other project meetings. This feedback and communication management strategy will be reflected in the Communication Management Plan.

This will benefit the project by minimizing the probability of competing objectives between stakeholders while capitalizing on the resource knowledge available to complete the project. Some stakeholders may have conflicting interests which may adversely affect the project efficiency. By initiating early and frequent communication and stakeholder management,

effective management of any conflicting interests can be accomplished without negative impact on project objectives.

Task Management Plan

The Project Manager will assign tasks to individuals described as resources. Many of these assignments will overlap ensuring the management team works in a synchronized manner.

Cost Management Plan

The Project Manager will be responsible for managing and reporting on the project's cost throughout the duration of the project. The Project Manager will present and review the project's cost performance during the monthly project status meeting. Using earned value calculations, the Project Manager is responsible for accounting for cost deviations and presenting the Project Sponsor with options for getting the project back on budget. All budget authority and decisions, to include budget changes, reside with the Project Sponsor.

Procurement Management Plan

The Project Manager will provide recommendations for all procurement activities under this project. Any procurement actions must be approved by the Project Sponsor.

Contract type – TBD

Make / Buy decision – Urea Distribution System equipment and processes will be purchased. In addition, the cost will be less overall to customize the equipment and processes than to buy existing equipment or models. It is generally agreed it is also important to have the appearance of industry standard cutting edge material.

Vendor Selection process – 3 vendors will be considered for equipment and customizing. The following weighted criteria were used to select equipment:

Proposal Evaluation		Vendors	Vendor 2	Vendor 3	UREA DISTRIBUTION SYSTEM
Criteria	Weight	Score 1-5 with 5 as Best			
Prior Work Experience	25%		0	0	0
Past Performance	50%		0	0	0
Work Plan	5%		0	0	0
Price	20%		0	0	0
Total Score			0	0	0

Baseline Cost Assessment

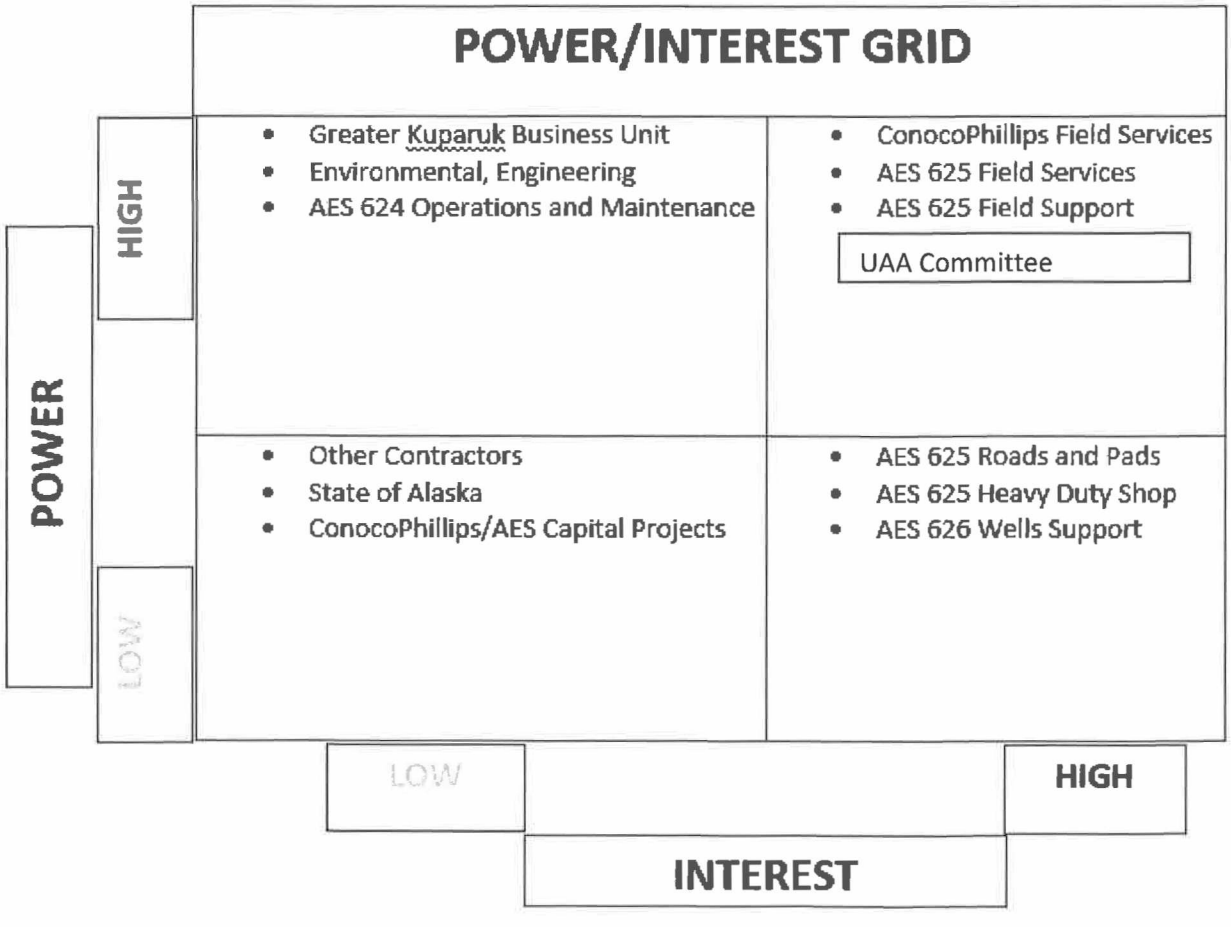
The Baseline Cost assessments will be discussed at management meetings and regular updates will be provided through measurement of key performance indicators. Status update reports will be issued at the meetings and the key performance indicators will be outlined for management and stakeholders.

Stakeholders

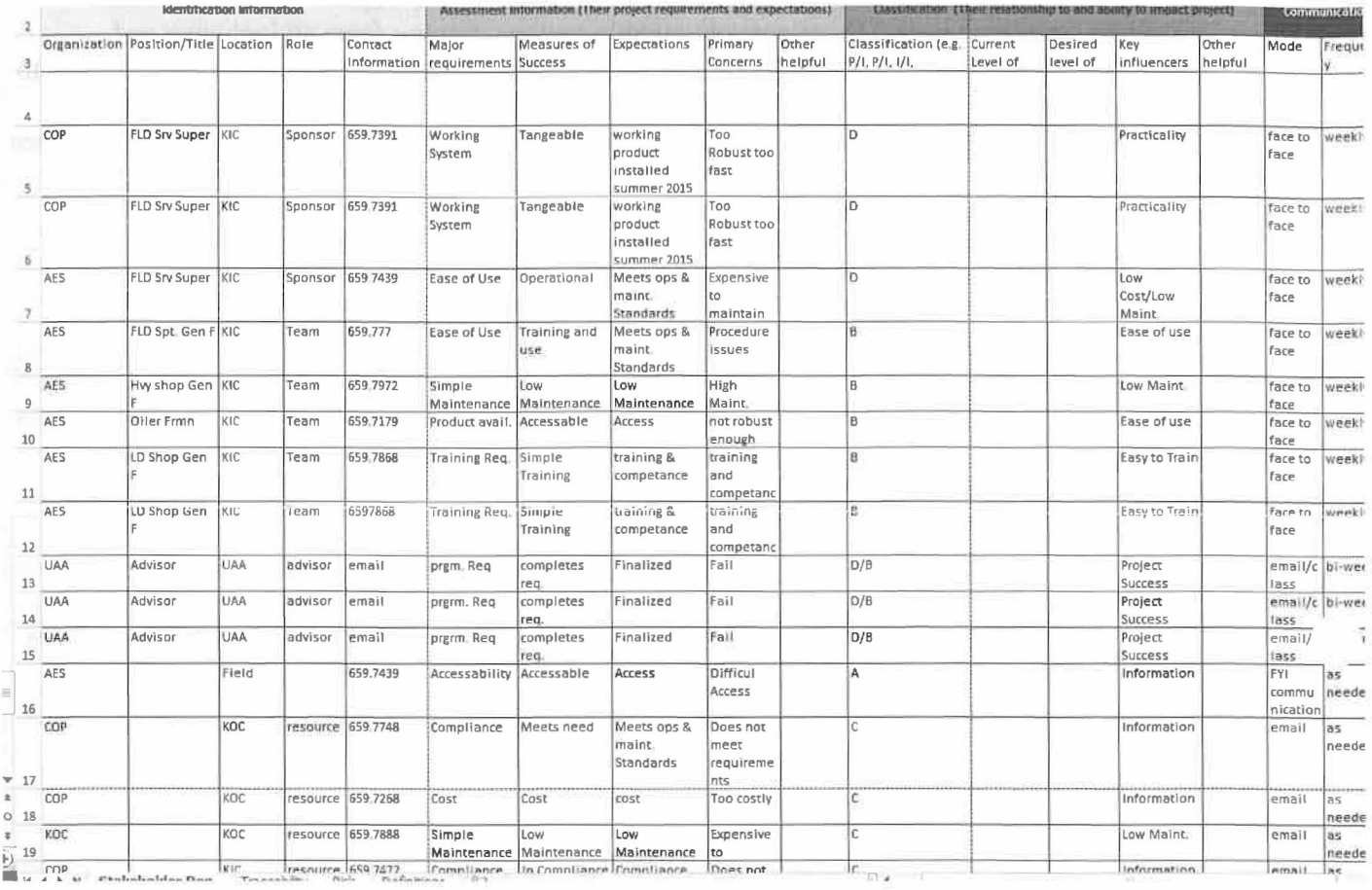
- State of Alaska
- ConocoPhillips (Greater Kuparuk Business Unit)
  Engineering, Environmental, Operations, and Maintenance
- ConocoPhillips Field Services
- ASRC Energy Services (AES) 625 Field Services
- AES Field Support 625 Support Services
- AES Field Support 625 Heavy Duty Shop
- AES Production Services 626 Wells Support
- AES Field Support 625 Roads and Pads
- AES Maintenance Services 624 Operations and Maintenance
- AES Maintenance Services 624 Capital Projects
- UAA Project Committee Members

Enterprise Environmental Factors

Engineering poses to be the main issue in accomplishing delivering the requirements for this specific project. Several vendors have been contacted and given the projects' unique issues. At this time, there are no products on the market that meet the requirements of this project. Every vendor that has been contacted are having to engineer their product to our requirements in dealing with the distribution system specifically at temperatures below -40 degrees F for sustained periods of time. There are some viable options ranging from all inclusive and contained APU units to utilizing systems with compressed natural gas. Every vendor spoken to is willing to manufacture a unique product tailored to our requirements. Additionally, the bidding process will require the project obtain a minimum of three bids per unit once it has been agreed on product selection. This poses a challenge in of itself in regards to the product requirements being so unique and specific to Kuparuk's conditions.



Stakeholder Register
(See also in appendices)



Identification Information					Assessment Information (Their project requirements and expectations)					Classification (Their relationship to and ability to impact project)					Communicatio	
Organization	Position/Title	Location	Role	Contact Information	Major requirements	Measures of Success	Expectations	Primary Concerns	Other helpful	Classification (e.g. P/I, P/I, I/I,	Current Level of	Desired level of	Key influencers	Other helpful	Mode	Frequ y
COP	FLD Srv Super	KIC	Sponsor	659.7391	Working System	Tangeable	working product installed summer 2015	Too Robust too fast		D			Practicality		face to face	weekl
COP	FLD Srv Super	KIC	Sponsor	659.7391	Working System	Tangeable	working product installed summer 2015	Too Robust too fast		D			Practicality		face to face	weekl
AES	FLD Srv Super	KIC	Sponsor	659.7439	Ease of Use	Operational	Meets ops & maint. Standards	Expensive to maintain		D			Low Cost/Low Maint.		face to face	weekl
AES	FLD Spt. Gen F	KIC	Team	659.777	Ease of Use	Training and use	Meets ops & maint. Standards	Procedure issues		B			Ease of use		face to face	weekl
AES	Hvy shop Gen F	KIC	Team	659.7972	Simple Maintenance	Low Maintenance	Low Maintenance	High Maint.		B			Low Maint.		face to face	weekl
AES	Oiler Frmn	KIC	Team	659.7179	Product avail.	Accessable	Access	not robust enough		B			Ease of use		face to face	weekl
AES	LD Shop Gen F	KIC	Team	659.7868	Training Req.	Simple Training	training & competance	training and competanc		B			Easy to Train		face to face	weekl
AES	LD Shop Gen F	KIC	Team	6597868	Training Req.	Simple Training	training & competance	training and competanc		B			Easy to Train		face to face	weekl
UAA	Advisor	UAA	advisor	email	prgm. Req	completes req.	Finalized	Fail		D/B			Project Success		email/class	bi-wee
UAA	Advisor	UAA	advisor	email	prgrm. Req	completes req.	Finalized	Fail		D/B			Project Success		email/class	bi-wee
UAA	Advisor	UAA	advisor	email	prgrm. Req	completes req.	Finalized	Fail		D/B			Project Success		email/ lass	
AES		Field		659.7439	Accessability	Accessable	Access	Difficul Access		A			Information		FYI commu nication	as neede
COP		KOC	resource	659.7748	Compliance	Meets need	Meets ops & maint. Standards	Does not meet requireme nts		C			Information		email	as neede
COP		KOC	resource	659.7268	Cost	Cost	cost	Too costly		C			Information		email	as neede
KOC		KOC	resource	659.7888	Simple Maintenance	Low Maintenance	Low Maintenance	Expensive to		C			Low Maint.		email	as neede
COP		KIC	resource	659.7472	Compliance	In Compliance	Compliance	Does not		C			Information		email	as

Stakeholder Management Plan

Sensitivity Analysis

As part of the final Integrated Process Team (IPT) gateway review a sensitivity analysis will be conducted to review the following four questions. Through multiple meetings and status updates, it has been determined that all questions and requests of the current project will be adequately met to all standards required of the initial project scope. However, one amendment has been made to accommodate all necessary improvements of the project. The project will incorporate a new modified baseline cost reflecting an increase to combat potential risks as described in the following:

Is all information included for a scope, schedule and budget analysis?

Can you reduce overall project budget without affecting completion date?

Determine least impact on scope and quality to reduce project duration by one month without affecting risk level of project.

Determine least expensive way to reduce project by one month with least overall impact to risk.

Summary Points:
1A) Stakeholder meetings occur weekly with necessary status updates on performance, progression and controls.

2A) Stakeholder meetings will permit suggested changes to be submitted on change request forms that will be reviewed and implemented based on committee approval and fit with current scope deliverables.

3A) The DEF DISTRIBUTION SYSTEM Research and Recommendation project will proceed unhindered from external factors and continue to its completion with the full support, determination and expectation from ConocoPhillips as to see the success of this project.

4A) The project will continue through to completion with little to no verification that it will inherently support an initial return on investment and additionally continue without knowledge of a Net Present Value as this project is not meant to serve as a profit base for ConocoPhillips.

Staffing Management Plan

The Project will consist of a matrix structure with support from a consulting firm, various internal organizations and two staff positions hired exclusively for UREA DISTRIBUTION SYSTEM implementation. Staffing requirements for the Project include the following:

- 2 Functional Managers
- 2 AES Superintendents
- PM Lead
- 2 Project Sponsors

Project Manager (1 position) – responsible for project management. The Project Manager is responsible for planning, creating, and/or managing all work activities, variances, tracking,

reporting, communication, performance evaluations, staffing, and internal coordination with functional managers.

Functional managers - responsible for decision on equipment and process documents. Oversight of all Urea Distribution System implementation to ensure functionality is compliant with quality standards and culture.

Milestone List

Major Milestones are listed in the following chart for the DEF Dispensing System Research and Recommendation project. The chart includes major Milestones that pertain to the course and to the project. The milestones are also reflected in the project schedule and WBS. Scheduling delays will result in communication with the project committee and the project sponsor as pertained in the stakeholder management matrix and in accordance with the communication management plan. Mitigations in accordance with the risk register will be applied. Change requests at this time can be communicated and will be received by the project manager to decide which avenue to take.

Milestone Schedule - List	
Project Milestone	Target Date
Project Initiation	9/1/14
Research Phase	9/4/14
Planned Budget Review	10/1/14
First Go/No-Go Decision	10/24/14
Final Project Decisions	11/17/14
Second Go/No-Go Decision	11/21/14
Hand off to Procurement	12/1/14
Final Deliverables Due	12/10/14

ConocoPhillips DEF Distribution System

Memo

To: University of Alaska Anchorage

From: Michael McDonough

Date: September 12, 2014

Re: Client/Sponsor letter of support for Michael McDonough to lead the DEF Distribution System Project at Kuparuk

---

We have selected Michael McDonough to be the project manager to establish a DEF Distribution System at Kuparuk by September 1, 2015. This project is an important and vital project for us because it will standardize our DEF Distribution System, provide operations management, align the project with our corporate strategic goals and help our company comply with EPA regulations while building an operations and maintenance plan for DEF distribution and dispensing.

As project manager, Michael McDonough is responsible for working with the team to develop a project plan that describes the objectives, deliverables, and implementation plan for the project. Mr. McDonough will work with our functional managers to assign the appropriate resources to the project.

Mr. McDonough will execute the project plan, monitor progress and performance, and take corrective action if necessary. Mr. McDonough will communicate assignments to functional managers and the members of the project team. For the duration of the project, Mr. McDonough will prepare and present status reports every week while on shift to the ConocoPhillips and AES Superintendents and management team.

I have the utmost confidence in Mr. McDonough and ask that you support her in achieving the objectives of this project. If you have any questions about his authority or responsibilities, please contact me.

Ray Chumley
Les Hardesty
Office: 907.659.7931
Cell: 907.943.1741
Email: n1805@conocophillips.com

Appendices

Exhibit A

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 86 and 89

[FRL–5645–4]

RIN 2060–AG78

Control of Air Pollution; Amendments to Emission Requirements Applicable to New Nonroad Compression-Ignition Engines at or Above 37 Kilowatts: Provisions for Replacement Compression-Ignition Engines and the Use of On-Highway Compression-Ignition Engines in Nonroad Vehicles

AGENCY: Environmental Protection Agency (EPA).

ACTION: Direct final rule.

SUMMARY: This rulemaking amends the regulations applicable to compression-

SUPPLEMENTARY INFORMATION:

I. Regulated Entities

Entities potentially regulated by this action are those which manufacture and use compression ignition engines of 37 kW or greater. Regulated categories and entities include:

Category	Examples of regulated entities
Industry	Manufacturers and users of compression ignition engines of 37 kW or greater.

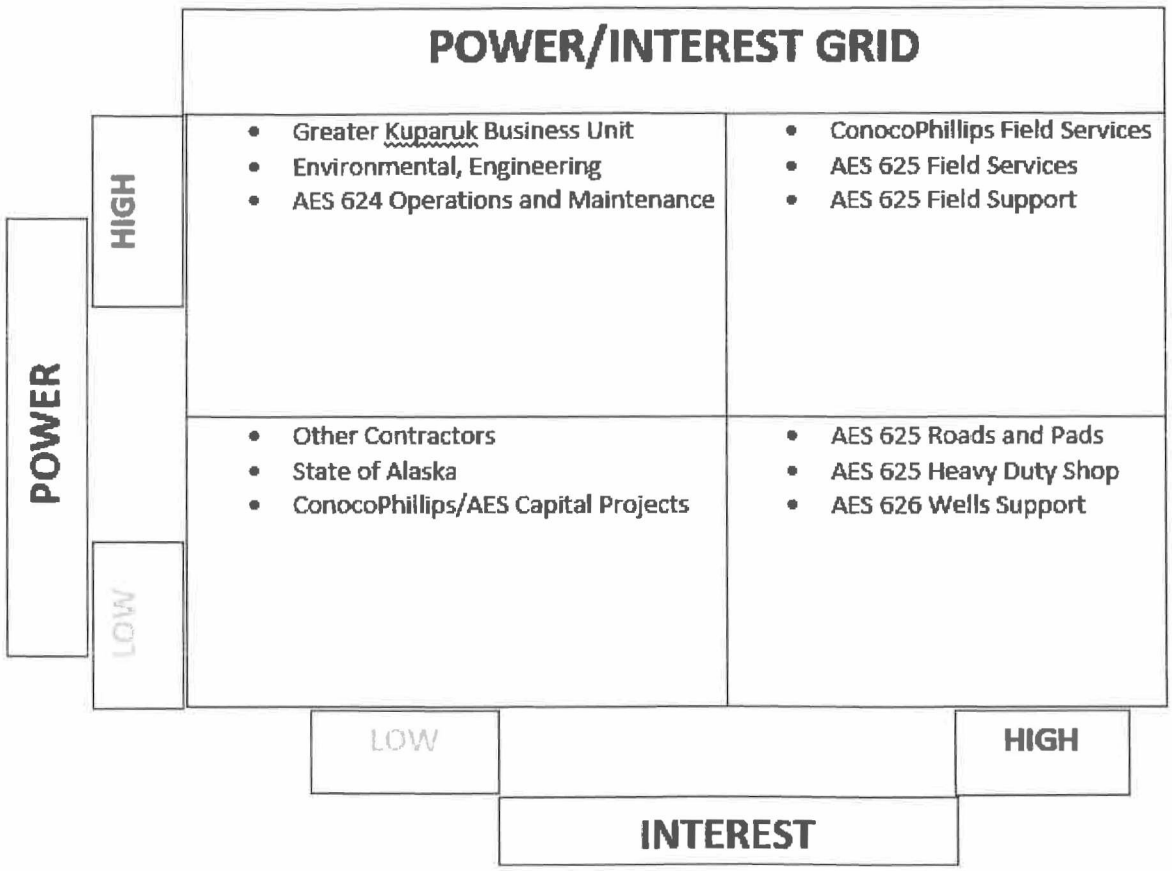
This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA is now aware could potentially be regulated by this action. Other types of entities not listed in the table could also be

ttnbbs.rtpnc.epa.gov Off-line: Mondays from 8:00–12:00 Noon ET.

1. Technology Transfer Network Top Menu: GATEWAY TO TTN TECHNICAL AREAS (Bulletin Boards)
2. TTN TECHNICAL INFORMATION AREAS: OMS—Mobile Sources Information
3. OMS BBS===MAIN MENU FILE TRANSFERS: Rulemaking & Reporting
4. RULEMAKING PACKAGES: Nonroad
5. Nonroad Rulemaking Area: File Area #2 . . . Nonroad Engines
6. Nonroad engines

At this stage, the system will list all available nonroad engine files. To download a file, select a transfer protocol which will match the terminal software on your computer, then set

Exhibit B


POWER/INTEREST GRID
HIGH
POWER
LOW
Greater Kuparuk Business Unit
Environmental, Engineering
AES 624 Operations and Maintenance
ConocoPhillips Field Services
AES 625 Field Services
AES 625 Field Support
Other Contractors
State of Alaska
ConocoPhillips/AES Capital Projects
AES 625 Roads and Pads
AES 625 Heavy Duty Shop
AES 626 Wells Support
LOW
HIGH
INTEREST

U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585-0121

Exhibit C

FY 2012 PROGRESS REPORT FOR ADVANCED COMBUSTION ENGINE RESEARCH AND DEVELOPMENT

Energy Efficiency and Renewable Energy
Vehicle Technologies Office

Approved by Gurpreet Singh
Team Leader, Advanced Combustion Engine R&D
Vehicle Technologies Office

December 2012
DOE-ACE-2012AR

Exhibit D

Diesel Technology Forum

CLEAN DIESEL TECHNOLOGY FOR OFF-ROAD ENGINES AND EQUIPMENT: *TIER 4 AND MORE*

Clean diesel technology is now the standard for all new technology, everything from new passenger cars and pick-up trucks to highway commercial trucks. Clean diesel is a system of three key parts: cleaner diesel fuel, advanced engine technology and aftertreatment. Now, starting in 2011, this new generation of clean diesel technology for off-road engines and equipment known

Exhibit E

Filtration

Diesel Exhaust Fluid (DEF) Q & A

BULLETIN

SCR: The Leading Technology to Meet 2010 Emission Regulations

Q. What is Selective Catalytic Reduction (SCR)?

A. SCR is a technology that uses a urea based diesel exhaust fluid (DEF) and a catalytic converter to significantly reduce oxides of nitrogen (NOx) emissions. SCR is the leading technology being used to meet 2010 emission regulations.

Q. How does an SCR system work?

A. The purpose of the SCR system is to reduce levels of NOx (oxides of nitrogen emitted from engines) that are harmful to our health and the environment. SCR is the aftertreatment technology that treats exhaust gas downstream of the engine. Small quantities of diesel exhaust fluid (DEF) are injected into the exhaust upstream of a catalyst, where it vaporizes and decomposes to form ammonia and carbon dioxide. The ammonia (NH3) is the desired product which in conjunction to the SCR catalyst, converts the NOx to harmless nitrogen (N2) and water (H2O).

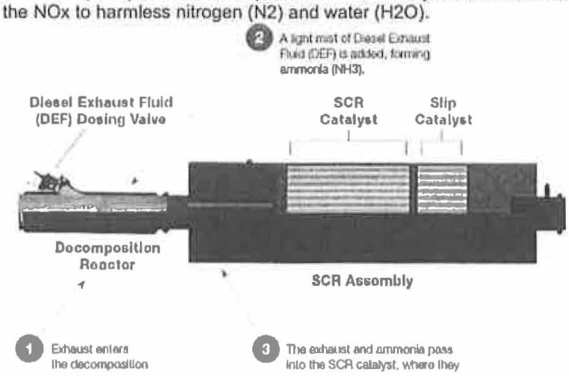


Exhibit F

Research Evaluation Matrix

Item#	Issue/Concern/Requirement	Requirement	Stakeholder	Power	Risk ID #	Mitigation #	Risk Severity	Research Method	Client Satisfied? Y/N	Change Order Requested? Y/N
1	Mobility	2	COP	4	5	5	5	Vendor	Y	Y
2	Safety	15	AES	4	7	7	5	Osha	Y	N
3	Reliability	3	COP	4	5	5	4	Vendor	Y	N
4	Weight	2	AES	4	7	7	5	Vendor	Y	Y
5	User Friendly	16	AES	4	5	5	3	vendor	Y	Y
6	Interchangeable Totes	2	AES	4	5	5	5	Vendor	Y	N
7	Lighted	8	AES	4	7	7	5	Vendor	Y	N
8	Back up Generator	9	AES	4	5	5	3	Vendor	Y	N
9	Penel Hitch	2	AES	4	5	5	3	Vendor	Y	N
10	Power Station Vehicle Supply	7	AES	4	5	5	5	Vendor	Y	Y
11	Eye Wash Station	6	AES	4	7	7	5	Osha	Y	N
12	Fire Suppression System	6	AES	4	7	7	5	Osha	Y	N

Exhibit G

VENDOR REQUIREMENTS TPA CSABILITY MATRIX

Project Name:	DEF Distribution R&R Project
Project Manager Name:	Mike McDonough
Project Description:	Procuring a DEF dispensing system for the Greater Kuparuk Business Unit

ID	Refinances Provided?	Prior Causes Relationship?	Purchasing Need	Description	Status	projected procurement date	Priority	Understands Complexity? Knowledgeable ?	Percentage of Requirements met	Meets Deadlines	Vendor	Additional Comments
Phase Gate 1			The procurement specialist team is in charge of the following									
11	N	N	Custom Built Trailer	Customized Dispensing Trailer	Declined	May 15, 2015	H	L	66%	N	Thunder Creek	Specialized account or purchase order will be req
12	Y	N	Custom built skid mount power module	Customized Dispensing Module	Logistical Issues	May 15, 2015	H	L	100%	Y	AmericaMotors	Specialized account or purchase order will be req
14	Y	Y	Custom built Flatbed Tanks	200 Gallon Flatbed Dispensing System	In Progress	May 15, 2015	M	H	100%	Y	Truckee!	Specialized account or purchase order will be req
16	Y	Y	Heating unit inside tank structure	Computer Work Station Training	In Progress	May 15, 2015	M	M	100%	Y	PowerBlanket	Specialized account or purchase order will be req
Phase Gate 2												
13	N	N	Fuel Truck equipped with DEF Dispensing	Fuel Truck	Build time too long	May 15, 2015	M	H	60%	N	Seneca Tank	Specialized account or purchase order will be req
15	Y	Y	Diler Truck outfitted with DEF Dispensing	Diler Truck	Build time too long	April 15, 2015	M	H	80%	Y	Dieman's Truck Delivery	Specialized account or purchase order will be req
015												

Exhibit H

Stakeholder Register Template

Assessment Information (Their project requirements and expectations)					Classification (E
Major requirements	Measures of Success	Expectations	Primary Concerns	Other helpful info	Classification (e.g. P/I, P/I, I/I, Salience, etc.)
Working System	Tangeable	working product installed summer 2015	Too Robust too fast		D
Working System	Tangeable	working product installed summer 2015	Too Robust too fast		D
Ease of Use	Operational	Meets ops & maint. Standards	Expensive to maintain		D
Ease of Use	Training and use	Meets ops & maint. Standards	Procedure issues		B
Simple Maintenance	Low Maintenance	Low Maintenance	High Maint.		B
Product avail.	Accessable	Access	not robust enough		B
Training Req.	Simple Training	training & competance	training and competancy		B
Training Req.	Simple Training	training & competance	training and competancy		B
prgm. Req	completes req.	Finalized	Fail		D/B
prgrm. Req	completes req.	Finalized	Fail		D/B
prgrm. Req	completes req.	Finalized	Fail		D/B
Accessability	Accessable	Access	Difficul Access		A
Compliance	Meets need	Meets ops & maint. Standards	Does not meet requirements		C

Cost	Cost	cost	Too costly		C
Simple Maintenance	Low Maintenance	Low Maintenance	Expensive to maintain		C
Compliance	In Compliance	Compliance	Does not meet requirements		C
Accessability	Accessability	Access	Difficult access		A
compliance	compliance	compliance	Spills		B
accessability	accessable	access	Difficult access		A
compliance	compliance	compliance	Spills		C
					C - High P/Low int - keep satisfied
					D - High P/High Int Mng. Close
					B - Low P/High Int keep informed
					A - Low P/Low Int Monitor

FN: Stakeholder Register Template 090513	Identification Information				
	Organization	Position/Title	Location	Role	Contact Information
Internal Stakeholders (internal to performing organization)					
Les Hardesty	COP	FLD Srv Super	KIC	Sponsor	659.7391
Ray Chumley	COP	FLD Srv Super	KIC	Sponsor	659.7391
Pat Holland	AES	FLD Srv Super	KIC	Sponsor	659.7439
Charlie Stewart	AES	FLD Spt. Gen F	KIC	Team	659.777O
Terry Nunberg	AES	Hvy shop Gen F	KIC	Team	659.7972
Steve Greer	AES	Oiler Frmn	KIC	Team	659.7179
Jamie Wajacha	AES	LD Shop Gen F	KIC	Team	659.7868
Jerry Blackson	AES	LD Shop Gen F	KIC	Team	659.7868
LuAnn Piccard	UAA	Advisor	UAA	advisor	email
Roger Hull	UAA	Advisor	UAA	advisor	email
Kim Dae Seong	UAA	Advisor	UAA	advisor	email
625 Field Services	AES		Field		659.7439
COP Engineering	COP		KOC	resource	659.7748

Cost	Cost	cost	Too costly		C
Simple Maintenance	Low Maintenance	Low Maintenance	Expensive to maintain		C
Compliance	In Compliance	Compliance	Does not meet requirements		C
Accessability	Accessability	Access	Difficult access		A
compliance	compliance	compliance	Spills		B
accessability	accessable	access	Difficult access		A
compliance	compliance	compliance	Spills		C
					C - High P/Low int - keep satisfied
					D - High P/High Int Mng. Close
					B - Low P/High Int keep informed
					A - Low P/Low Int Monitor

Their relationship to and ability to impact project)				Communication (How they like to be comm			
Current Level of Support	Desired level of	Key influencers /relationships	Other helpful info	Mode	Frequency	Level of detail	Format
		Practicality		face to face	weekly	High	Status updates
		Practicality		face to face	weekly	High	Status updates
		Low Cost/Low Maint.		face to face	weekly	High	Status updates
		Ease of use		face to face	weekly	High	Status updates
		Low Maint.		face to face	weekly	High	Status updates
		Ease of use		face to face	weekly	High	Status updates
		Easy to Train		face to face	weekly	High	Status updates
		Easy to Train		face to face	weekly	High	Status updates
		Project Success		email/class	bi-weekly	High	Status updates
		Project Success		email/class	bi-weekly	High	Status updates
		Project Success		email/class	bi-weekly	High	Status updates
		Information		FYI communications	as needed	Low	phone/informal
		Information		email	as needed	Med	phone/informal

Exhibit I

PROJECT MANAGEMENT PLAN
AUGUST 19, 2014
Questionnaire Protocol Form

Diesel Exhaust Fluid System Distribution System Research and Recommendation Project

Date of Meeting: _____

Organization: _____

Participants: _____

Meeting Agenda (Question Set to be used):

____A. Vendor Present
____B. Question and Answers Format
____C. Research Change Request
____D. Additional Contractors Consulting Session

Agenda Highlights:

_____
_____
_____
_____
_____

Research Strategies Discussed:

_____
_____
_____
_____

Requirements Discussed:

_____
_____
_____
_____
_____

Risks/Constraints Discussed:

_____
_____

Wish List Requests:

Risk Mitigation Strategies Discussed:

Introduction

You are part of a project team to deliver to the client their request to research and procure a diesel exhaust fluid distribution system to heavy equipment across the Kuparuk Oil Field. Additionally, this project is being led by Michael McDonough as part of his capstone project and your input is valuable for him to satisfy the requirements for his courses at the University of Alaska Anchorage. You have returned to me the consent form for this research, and I thank you for your participation and expertise as a member of the project team.

The project is focused on the following Problem Statement, which you have been supplied with in advance.

An EPA regulation and mandate in 1996 has caused engine manufacturers of diesel engines to implement a Diesel Exhaust Fluid System in to their emissions system to reduce Nitrous Oxide (NOx) emissions. ConocoPhillips needs to develop a way to distribute the Diesel Exhaust Fluid (DEF) throughout the field to its new tier 4 equipment in the harsh Arctic Climate. DEF needs to be temperature controlled to keep from freezing throughout the winter months and there is currently no systems available or in existence on the Kuparuk Oil Field where ConocoPhillips has its operations. ConocoPhillips needs to research and purchase a system that meets requirements of the stakeholders and deliver DEF throughout the field.

Research is ongoing and being conducted to gather ideas, validate function and support development of the following deliverables.

- Researching viable product options.
- Researching reputable vendors who can engineer out our requirements.
- Research applicable laws, OSHA requirements and handling procedures.
- Provide a detailed recommendation for a vendor and product that will meet the client's needs.

Question Set – System Preference

1. Do you identify the need for a DEF distribution system as being absolutely necessary to the needs of the field?
    ____Yes
    ____No
2. Do you feel the need for DEF Distribution System to be mobile?
    ____Yes
    ____No

3. What medium would you prefer the DEF distribution system to be utilized?
    _____Trailer
    _____Box Van
    _____Tanker
    _____Module
    _____100 gal. tank on a pick up
    _____Custom Fuel Truck

4. Do you perceive any logistical issues with man power or equipment availability?

5. Are there Standard Operating Procedures that may conflict with obtaining a DEF Distribution System?

6. Does cost of the DEF Distribution System weigh into your preference?

7. What size DEF Distribution System would you prefer to see for the initial purchase? Enough to fill how many vehicles with one tank or tote?

Question Set – Systems Vendor

1. Do you have a preferred Vendor in mind for researching if they can meet the client's requirements? If so, who?

2. Are there similar products available that you would like to see researched to see if they can meet our needs?

3. Are there specific product specifications you need to know for handling DEF in your department?

4. Are there safety precautions you want to have researched prior to purchase?

Question Set – Systems Research

1. In your opinion, where should the majority of research be focused?
   _____Academic
   _____Vendor
   _____Product Line
   _____Legal/EPA Statutes
   _____OSHA Regulation
2. Are there specific requirements or topics you want or need to know more about?

Exhibit J

NSK AES Prod Srv Proctor

From: Bob Taylor <bobt@americont.com>
Sent: Saturday, November 01, 2014 5:12 PM
To: NSK AES Prod Srv Proctor
Cc: Hans Czeranna
Subject: [EXTERNAL]Re: Re: Re: Preliminary DEF Unit Layout

We should be able to do so during Alaska morning hours. 1:30 Eastern time should be workable. Let me know if that will work.

Bob Taylor, Sales Eng.
American Controls, Inc.
248-476-7782 Ext 229
248-790-3317 (Cell)

www.americancontrolsinc.com
www.defdispensing.com

On Sat, Nov 1, 2014 at 7:52 PM, NSK AES Prod Srv Proctor <N1970@conocophillips.com> wrote:

Bob,

Can we set up a conference call with you and any engineers for Monday? Ray would like to speak to you about the money and options regarding the trailer. Ray is available anytime Monday aside from 1-2pm Alaska Time. He is the Conoco superintendent of field services.

Thanks,

Michael McDonough/Jason Simmons

ASRC Energy Services

Safety Proctor

Operations and Maintenance

Direct: 907.659.3924

Meeting Minutes

Exhibit K

Urea Distribution Project

08/13/14

Attendees:

Terry Nunberg

Charles Stewart

Kevin Feller

Ray Chumley

Mike McDonough

Issues:

(1A) No current method to transport bulk quantities to Kuparuk.

(2A) There are currently rumors and evidence that engine manufacturers are seeking to eliminate DEF from their systems.

(3A) The EPA has not come to a ruling on storing large amounts of DEF in tanks above 1,350 gallons. They have not decided whether it will fall under agricultural or oil and gas in their ruling. DEF contains Ammonia and while small amounts of DEF pose no real issues 30-40,000 gallons may.

(4A) Until further investigation, 300 gallon totes is the largest we can currently purchase urea.

Solutions:

(1A) Looking at a tandem axel trailer that is enclosed, heated, and has a duel system for loading and distributing by Thunder Creek Equipment.

(2A) Looking at a module on a skid to place KIC pad with at least a 1300 gallon tank for self-distribution if the trailer is out servicing other vehicles. Will have a conference call at meeting on Wednesday 8/20 at 1pm. Contact is Bob at 248-790-3317 with DEF Dispensing. They are all custom built and they also have trailer systems.

(3A) Thunder Creek Equipment also makes a utility Box style distribution tank for a pick-up truck that holds 100 gallons of heated urea. Terry and Mike are meeting via conference call with Thunder Creek Equipment to discuss solutions.

(4A) Mike is meeting with Wayne Terpstra in Kansas City on his R&R to learn about fuel trucks and using a duel tank system: half urea, half diesel.

Exhibit L

Requirements Traceability Matrix

Requirement #	Source (Stakeholder Name or Group, Reference Document, etc.)	Stakeholder Register Reference	Requirement Description	Requirement Classification (business, functional, regulatory, etc.)	Project Objective Reference	Priority	WBS Work Package Reference	Acceptance Criteria	Validation method	Risk Register Reference	Key Dependencies, Impacts, Contraints	Owner
1	COP	5,6	DEF Distribution System	Functional	1	5	1.1	research, bids requirements	Final approval	5	Engineering	PM/ Sponsor
2	COP	5,6	Portable/Mobile	Functional	2	5	1.1.2	bids/proposals	vendor confirmation	5	Engineering/product availability	PM/ Vendor
3	COP	5,6	Not over-built	business	3	4	1.1	bids/proposal/research	research/product description	4	Engineering/product availability	PM/ Vendor
4	COP	5,6	Climate Control	Functional	4	5		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
5	COP	5,6	Blast proof	Functional	5	4		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
6	COP	5,6	Secondary Containment	Regulatory	6	5		bids/proposal	research/product description	7	Engineering/product availability	PM/ Vendor
7	COP	5,6	Shore Power hook up	Functional	7	5		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
8	AES 627 Camp Maintenance	19	Outside Lighting	Functional	8	4		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
9	AES 625 Field Services	16	Generator Built In	Functional	9	4		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
10	AES 625 Field Services	16	30 hours run time on Generator	Functional	10	3		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
11	AES 625 Field Services	16	Fork Pockets	Functional	11	3		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
12	AES 625 Field Services	16	Picking Eyes	Functional	12	3		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
13	AES 625 Field Support	8	Overflow Preventor	Functional/Regulatory	13	5		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
14	AES 625 Heavy Duty Shop	9	Stockable Maintenance Parts	Business	14	4		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
15	AES 625 Light Duty Shop	11,12	Training	Business	15	4		bids/proposal	research/product description	5	Engineering/product availability	PM/ Vendor
16	AES 626 Wells Support/AES 625 Field Support	16,21	Easily Accessible	business	16	4		bids/proposal	research/product description	5	Logistics/planning	Planner/ PM
17	AES 626 Wells Support/AES 625 Field Support	16,22	Easily Accessible	business	16	4		bids/proposal	research/product description	6	Logistics/planning	Planner/ PM
18	AES 626 Wells Support/AES 625 Field Support	16,23	Easily Accessible	business	16	4		bids/proposal	research/product description	7	Logistics/planning	Planner/ PM
19	AES 626 Wells Support/AES 625 Field Support	16,24	Easily Accessible	business	16	4		bids/proposal	research/product description	8	Logistics/planning	Planner/ PM
20	AES 626 Wells Support/AES 625 Field Support	16,25	Easily Accessible	business	16	4		bids/proposal	research/product description	9	Logistics/planning	Planner/ PM
21	AES 626 Wells Support/AES 625 Field Support	16,26	Easily Accessible	business	16	4		bids/proposal	research/product description	10	Logistics/planning	Planner/ PM
22	AES 626 Wells Support/AES 625 Field Support	16,27	Easily Accessible	business	16	4		bids/proposal	research/product description	11	Logistics/planning	Planner/ PM
23	AES 626 Wells Support/AES 625 Field Support	16,28	Easily Accessible	business	16	4		bids/proposal	research/product description	12	Logistics/planning	Planner/ PM
24	AES 626 Wells Support/AES 625 Field Support	16,29	Easily Accessible	business	16	4		bids/proposal	research/product description	13	Logistics/planning	Planner/ PM
25	AES 626 Wells Support/AES 625 Field Support	16,30	Easily Accessible	business	16	4		bids/proposal	research/product description	14	Logistics/planning	Planner/ PM
26	AES 626 Wells Support/AES 625 Field Support	16,31	Easily Accessible	business	16	4		bids/proposal	research/product description	15	Logistics/planning	Planner/ PM
27	AES 626 Wells Support/AES 625 Field Support	16,32	Easily Accessible	business	16	4		bids/proposal	research/product description	16	Logistics/planning	Planner/ PM

Exhibit M

State Regulatory/Code Specifics

This reference section has been provided courtesy of Thompson Publishing Group's *Aboveground Storage Tank Guide*. The information contained here is an abridged version of what appears in the *Aboveground Storage Tank Guide*. For example, the *Aboveground Storage Tank Guide* covers additional topics such as permits, fees, release reporting, corrective action procedures, trust funds, tank closures, certification requirements, tank testing, record keeping, and available state documents. Also note that regulatory and code information is constantly evolving and changing. While every attempt has been made to include the latest information from each state, it is the responsibility of the user of this program to verify the correct, updated codes and regulations. Thompson Publishing's *Aboveground Storage Tank Guide* is a comprehensive reference manual on technical and regulatory compliance information on USTs. Subscribers to the *Aboveground Storage Tank Guide* receive monthly updates to the guide as well as a newsletter of current trends and developments. For more information on the guide, contact:

Thompson Publishing Group
Aboveground Storage Tank Guide
1725 K Street, NW 7th Floor
Washington, DC 20006
1-800-677-3789

Alaska

Fire Code Restrictions:

Program Description: The state has adopted the Uniform Fire Code (UFC), 1997 edition (Alaska Stat. 18.70.080). The UFC has been modified by the state to allow the storage and dispensing of motor vehicle fuel from aboveground storage tanks (ASTs).

ASTs are not required to be registered. However, prior to construction of an aboveground storage facility, an owner or operator must obtain a permit form the state fore marshal. The permit application must contain a site plan showing tanks, supports, facility location, diking and other requirements in the UFC. ASTs are not required to be inspected.

State regulations require that tanks at aboveground facilities be located at least 50 feet from the nearest "important" building on the property, 50 feet from any fuel dispenser, 50 feet from the side of the nearest public way, and 75 feet from any property line. Protected tanks must be separated by at least 15 feet from any property line, 5 feet from the nearest public way, and 3 feet from any adjacent tank. Tanks also must be enclosed by a 6-foot high chain link fence, separated from the tank by at least 5 feet.

Contractors must obtain a license to install tanks from the state Department of Commerce's Division of Occupational Licensing, and a fitness card from the state Department of Labor's Labor Standards and Safety Section.

Local Programs: Local jurisdictions may adopt ordinances more stringent than those in the state code. Local ordinances may prohibit tanks entirely. The state fire marshal has deferred its authority to the cities of Anchorage, Fairbanks Juneau, Kenai, Kodiak, Seward, Sitka and Soldotna, and its inspection authority to the city of Valdez.

For information, contact:
Chester Weger
Assistant State Fire Marshal
Division of Fire Prevention
State Fire Marshal's Office
5700 East Tudor Road
Anchorage, AK 99507
(907) 269-5491
(907) 338-4375 (fax)

Environmental Regulations:

Program Description: Pursuant to § 46.04.030(a) of the State of Alaska Oil Pollution Statutes, operation of an "oil terminal" requires an oil discharge prevention and contingency plan. Oil terminals that have an effective storage capacity of less than 5,000 barrels of crude or 10,000 barrels of noncrude oil are exempt.

AST Regulations:

The state of Alaska has promulgated regulations that specifically detail the requirements for ASTs located in state-regulated oil terminals. Any tank that has an effective storage capacity of 10,000 gallons or greater and is located in a state-regulated oil terminal is subject to the state regulations found in Alaska Admin. Code tit. 18, article 1, 75.005-.090.

In general, these regulations require that ASTs be constructed in accordance with API standard 650 and be inspected and maintained to API standard 653. ASTs also are required to have cathodic protection and leak detection, and overfill protection in accordance with Alaska Admin Codes.

All regulated ASTs are required to be placed in a sufficiently impermeable secondary containment system as specified in Alaska Admin. Code tit. 18, 75.075, and have associated piping comply with the standards set forth in Alaska Admin Code tit. 18, 75.080.

The regulations require that tanks be equipped with one or more means of overfill prevention, including: high liquid level alarms, high liquid level automatic shutoff devices to stop flow at a predetermined level, a means of immediately determining the liquid level of each bulk storage tank, or another system approved by the department. Overfill prevention devices must be tested before each transfer operation or monthly, whichever is less frequent.

The regulations also contain extensive secondary containment requirements. Tanks must be located within a secondary containment area that has the capacity to hold the volume of the largest tank within the containment area, plus enough additional capacity to allow for local precipitation. Minimum secondary containment system requirements include berms, dikes or retaining walls that are constructed to prevent the release of spilled oil from within the containment area. Components of the system must be constructed of, or lined with, materials that are sufficiently

permeable and resistant to damage by the stored product or prevailing weather conditions.

The general pollution prevention regulations require that the owner or operator of an oil terminal or other regulated facility ensure that all personnel are properly trained regarding company and state pollution prevention measures, and that they provide security measures and surveillance sufficient to minimize the risk of vandalism, sabotage and unauthorized entry. Records documenting such measures must be maintained for three years.

The owner of an oil terminal facility in the state with an aggregate storage capacity of more than 5,000 barrels of crude oil must provide the state Department of Environmental Conservation (ADEC) with evidence of financial responsibility in the amount of $56,250,000 per incident. For a noncrude oil terminal with an aggregate storage capacity of more than 10,000 barrels, the owner or operator must demonstrate financial responsibility of $28.13 per incident for each barrel of storage capacity at the terminal or $1,125,000, whichever is greater, subject to a maximum of $56,250,000. Financial responsibility may be provided by insurance, self-insurance, guaranty, surety or letters of credit.

The state requires that spills of oil and hazardous substances be reported to ADEC's 24-hour hotline at (800) 478-9300 in state and (907) 269-5711 out of state. A person in charge of a facility must report immediately any discharge of a hazardous substance other than oil, any discharge of oil to water, or any discharge of oil to land outside a secondary containment area that exceeds 55 gallons. Any discharge to land of more than 10 gallons but less than or equal to 55 gallons, or of more than 55 gallons into a secondary containment area, must be reported within 48 hours.

The facility owner or operator must file a report with the department within 15 days after any discharge of 10 gallons or more. Cleanup efforts must commence immediately upon discovery of the spill or release. The person in charge of a facility must maintain records, and report to ADEC monthly, on the amount of any discharge of oil, including a cumulative discharge, of more than one gallon but less than 10 gallons.

For information, contact:

Larry Katkin
Terminal and Tank Farms Section Manager
Spill Prevention and Response Division
Alaska Department of Environmental Conservation
610 University Avenue
Fairbanks, AK 99709-3643
(907) 451-2127
(907) 451-2155 (fax)

Spill Contingency Plans:

Section 46.04.030 of the State of Alaska Oil Pollution Statutes requires that all oil terminal facilities within the state with total storage capacity greater than 5,000 barrels crude or 10,000 barrels noncrude oil have an oil discharge prevention and contingency plan that has been approved by (ADEC). The state may require the holder of an approved contingency plan to demonstrate periodically its ability to carry out the plan, through response team exercises and through inspection of equipment inventories, supplies and personnel. An approved plan must be renewed every three years.

To receive approval from ADEC, the contingency plan must demonstrate that the facility has access to sufficient oil discharge containment, storage, transfer and cleanup equipment, personnel and resources to contain, control and clean up, within 72 hours, a discharge from an oil terminal facility that is equal to the capacity of the largest oil storage tank at the facility. Spills to land must be cleaned up in the shortest time possible. Preventive measures specified in the regulations include cathodic protection, operations training programs, alcohol and drug testing of key personnel, leak detection systems, and tertiary containment outside the secondary containment area.

A contingency plan must contain a response action plan, a spill prevention plan, and an analysis of best available technology. The response action plan must detail the immediate response and notification steps to be followed if a discharge occurs. Reporting and notification actions must be included, along with an incident- specific safety plan, a description of field communication procedures and response equipment deployment strategies.

The spill prevention plan must include a detailed description of all oil discharge prevention measures and policies employed at the facility, with references to the risks involved. The plan also must include a description of all regular pollution prevention, inspection, and maintenance programs in place at the facility, and a history of all known discharges of 55 gallons or more that have occurred there. The plan should include an analysis of potential oil discharges, including size, frequency, duration and location. It also should include the existing and proposed means of discharge detection, and a description of any conditions at the facility that might increase the risk of a discharge or the risk of a fire hazard in the event of a discharge.

The best available technology analysis must evaluate systems such as leak detection, cathodic protection, corrosion control, communications, discharge tracking, wildlife protection, tug escorts and emergency towlines relative to cost, availability, existing systems and environmental impact.

The contingency plan also must include a supplemental section that contains: a facility description and operational overview; the potential routes of travel of discharged oil to open water; a description of the command system to be used in response to a discharge; the realistic maximum response operating limitations; identification of logistical support and response equipment; a description of the training program for employees; response contractor information; identification of environmentally sensitive areas; and a proposed facility response plan to prevent contamination of environmentally sensitive areas in the event of an oil spill. For each of these elements, the regulations spell out specific approval criteria. ADEC may conduct announced and unannounced inspections of facilities to determine compliance with facility contingency plans and may require that a facility perform discharge exercises to assure that the plan is adequate in content and execution.

For information, contact:

Kenneth Rogowski
Industry Preparedness Program
Spill Prevention and Response Division

Exhibit N

CPC™

WHITE PAPER 4004

10 reasons to consider closed system liquid dispensing for bulk shipping containers

By
Thomas A. Braun
Business Manager –
Chemical & Packaging Products
Colder Products Company

When liquid contents are hazardous — and even when they aren't — closed system dispensing delivers significant economic, safety and environmental benefits to people and processes.

At any given time, there are millions of liquid-filled drums and IBC "totes" in circulation around the world, transporting everything from edible oils and flavorings to detergents and solvents or other hazardous media such as sulfuric acid or potassium hydroxide. These containers provide industries an efficient way to deliver bulk liquid ingredients and products from the producers/manufacturers and blenders who package them to the end users — who, in turn, need to transfer the liquids into smaller containers, or into equipment for end-use processes.

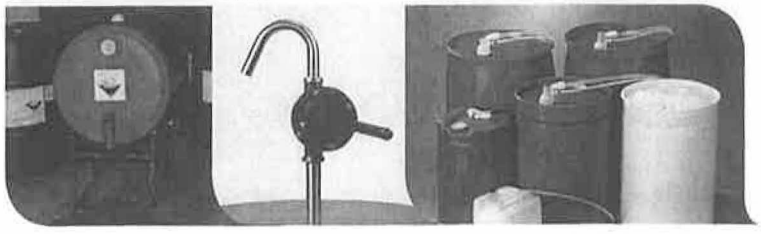
Historically, the simplest transfer method has been through an "open" dispensing system — by simply pouring the liquid out of the original shipping container into a bucket using a spigot. This method, however, is typically messy and risks splashes and spills that expose workers and the environment to potential hazards from the liquid media and from the fumes they generate. See Figure 1.

Another common method used in many industries employs a "semi-closed" dispensing system where a "stinger"-type dip tube draws the contents out of a vertically oriented container using an attachable hand or electric/air-driven screw-type transfer pump. See Figure 2.

While this approach is a step in the right direction, the semi-closed dispensing system is typically not sealed and allows possibly dangerous fumes from the chemical to pollute the atmosphere in the work space. In addition, the semi-closed approach requires workers to insert and remove a dip tube each time a new drum is emptied — a process that still exposes them to drips, leaks and fumes during the transfer.

A third liquid-dispensing approach is the "closed" or sealed system, and this is a significantly safer approach than either the open or semi-closed methods. Closed systems rely on a pump to draw the media from the container and deliver it to the end process. See Figure 3.

Figure 1 Figure 2 Figure 3



DEFendal™ Diesel Exhaust Fluid-MSDS

Section I – Chemical Product and Company Information

Product Name: DEFendal Diesel Exhaust Fluid
Product Code: 4103
Product Use: NOx reduction agent

Preparation Date: 11/20/09
Revision Date:

Manufacturer: KOST USA, INC.
Address: 8118 Corporate Way, Suite 105
Mason, OH 45040

Telephone: (513) 583-7070
Emergency Telephone Number: 1-800-424-9300 (Chemtrec)

Section II – Hazardous Ingredients/Identity Information

Hazardous Components	CAS Number	%	PEL (OSHA)	TLV (ACGIH)
Urea	57-13-6	30 – 35	-	-

This product is not a WHMIS controlled substance.

Section III Physical/Chemical Characteristics

Boiling Point:	Not Determined
Specific Gravity @ 68°F (20°C):	1.09
Vapor Pressure @ 20°C:	220 mmHg
Solubility in Water:	Soluble
Appearance and Odor:	Colorless liquid, mild ammoniacal odor
Freezing Point:	- 74°F (-59°C)
pH:	Typically 10.0

Section IV Fire & Explosion Data

Flash Point:	Not Applicable
Method Used:	Not Applicable
Auto-Ignition Temp:	Not Applicable
Upper Explosion Limits:	Not Applicable
Lower Explosion Limits:	Not Applicable

Extinguisher Media: Water recommended, all standard agents are acceptable.